EFFECTS OF FINANCIAL LIBERALIZATION ON STOCK MARKET DEVELOPMENT, FDI INFLOWS AND TFP IN SELECTED AFRICAN COUNTRIES

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BY

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ABSTRACT

Under the International Monetary Fund and World Bank structural adjustment reform programs, liberalization was introduced to the developing countries as a means of growing these economies. However, two decades after liberalization, empirical findings of some of the liberalized countries in Sub-Saharan African (SSA) countries show mix results. The study sets out to investigate the long run influence of financial liberalization on stock market development, foreign direct investment (FDI), and total factor productivity (TFP) for seven selected SSA countries for the period 1990-2013. The study employs dynamic panel data analysis to investigate for the influence of liberalization on stock market development, FDI and productivity in the seven selected SSA countries. The techniques of Pooled Mean Group (PMG) and the Mean Group (MG) are employed to determine possible long run relationships among the variables. The direction and effects of liberalization on stock market and FDI, and the effects of these FDI inflows on productivity change is crucial for the development of the nascent economies of the SSA. Findings validate the positive significant impact of stock market liberalization on the development of stock market. Liberalized interest rate however has a long run negative influence on development of stock market although it has a positive effect on FDI. The study thus recommends that the individual SSA economies should set up market-friendly financial policy that would further boost the contribution of liberalization to their economies. More efforts should be made to improve the state of poor institutions in order to enhance FDI in the selected SSA nations in order for foreign investment to have sustained impact on productivity. Steps should be taken to encourage the local citizens to invest in stock market so as to reduce the overbearing influences of foreigners in the stock market.

Keywords: foreign direct investment, liberalization, stock market development, total factor productivity, Sub-Saharan African countries.

ABSTRAK

Liberalisasi diperkenalkan kepada negara-negara membangun untuk memacu kemajuan ekonomi di negara tersebut di bawah program pembaharuan pengubahsuaian struktur Dana Kewangan Antarabangsa dan Bank Dunia. Namun begitu, dua dekad selepas liberalisasi diketengahkan, dapatan empirik dalam kajian yang dijalankan di beberapa negara Sub-Sahara Afrika (SSA) memperlihatkan hasil dapatan yang berbeza. Kajian ini dikendalikan untuk menyelidik kesan jangka panjang liberalisasi kewangan terhadap pembangunan pasaran saham, pelaburan asing langsung (FDI) dan produktiviti faktor keseluruhan (TFP) di tujuh buah negara SSA terpilih bagi tempoh 1990-2013. Kajian ini menggunakan analisis data panel dinamik untuk mengkaji kesan liberalisasi ke atas pembangunan pasaran saham, FDI dan TFP di tujuh buah negara SSA. Teknik Kumpulan Min Terkumpul (PMG) dan Min Terkumpul (MG) digunakan untuk menentukan hubungan jangka panjang dalam kalangan pemboleh ubah. Hala tuju dan kesan liberalisasi pasaran saham dan FDI serta kesan aliran masuk FDI terhadap perubahan produktivi adalah penting kepada pertumbuhan ekonomi SSA yang baru berkembang. Dapatan kajian mengesahkan impak positif yang signifikan liberalisasi pasaran saham terhadap pembangunan pasaran saham. Walau bagaimanapun, kadar faedah liberalisasi mempunyai kesan negatif jangka panjang terhadap pembangunan pasaran saham meskipun ia memberi kesan positif terhadap FDI. Kajian ini menyarankan agar ekonomi setiap negara SSA menggubal dasar kewangan yang lebih mesra pasaran yang boleh merangsang lebih banyak sumbangan liberalisasi kepada pertumbuhan ekonomi di negara-negara SSA. Lebih banyak usaha perlu dilaksanakan untuk memperbaiki kelemahan institusi bagi merangsang FDI di negara SSA terpilih dan seterusnya memastikan FDI memberikan impak yang mampan terhadap pertumbuhan ekonomi. Usaha-usaha yang perlu diambil adalah dengan menggalakkan warga tempatan melibatkan diri dalam pasaran saham supaya dapat mengurangkan kebergantungan kepada warga asing dalam pasaran saham.

Kata kunci: pembangunan pasaran saham, pelaburan asing langsung, produktiviti faktor keseluruhan, liberalisasi, negara-negara Sub-Sahara Afrika.

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LISTS OF ABBREVIATIONS

ADF	Augmented Dickey Fuller
ARDL	Autoregressive Distributed Lag
AREAR	Annual Report on Exchange Arrangements and Exchange Restrictions
BCEAO	Central Bank of the West African States.
BTSW	Botswana
CIV	Cote d'Ivoire
DCPS	Domestic Credit to the private sector as a percentage of GDP
DF	Dickey Fuller
DFE	Dynamic Fixed Effects
ECM	Error Correction Mechanism
ECOWAS	Economic Community of West African States
ECT	Error Correction Terms
EP	Export Promotion
FEVD	Forecast Error Variance Decomposition
FDI	Foreign Direct Investment
GDP	Gross domestic product
GDPP	GDP per capita
GFK	Gross fixed Capital formation
GHA	Ghana
GIVE	Generalized Instrumental Variable Estimation
GMM	Generalized Methods of Moments

HCAP	Human Capital
ICRG	International Country Risk Guide
ILO	International Labour Organisation
IMF	International Monetary Fund
INSTI	Institutional Quality
IPS	Im Pesaran & Smith
IS	Import Substitution
K& S	Kaminsky & Schmukler
KEN	Kenya
LFT	Labour Force Total
LL	Levin and Lin
LLC	Levin Lin & Chu
M -S	McKinnon (1973) Shaw (1973)
MALS	Malaysia
MART	Mauritius
MCAP	Market capitalization
MG	Mean Group
MNCs	Multinational Corporations
MNE	Multinational Enterprises
OECD	Organization for Economic Cooperation and Development
OLI	Organizational Location and Internationalization
OLS	Ordinary Least Square

P & S Pesaran & Smith

PILP Philippine

PMG Pooled Mean Group

PRS Political Risk Service

R & D Research and Development

RGDP Real GDP

RLIB Interest Rate liberalization index

SAF South Africa

SAP Structural Adjustment Program

SEM Stock Exchange of Mauritius

SLIB Stock market liberalization index

SSA Sub-Saharan Africa

TFP Total Factor Productivity

THAI Thailand

TRNV Turnover ratio

UK United Kingdom

UNDP United Nations Development Program

US United States

US$ United States Dollar

USTB United States Treasury bill

VAR Vector Autoregressive

VECM Vector Error Correction Model

WAMU West African Monetary Union

WDI World Development Indicator.

CHAPTER ONE

INTRODUCTION

1.1 Introduction

Developing countries are beset with the problems of generating capital flows to shore up investment in order to promote growth. McKinnon (1973) and Shaw (1973) recommend liberalization of the financial sector so as to attract the desired savings for development. However, attempts at liberalization yield little or no fruitful results among the sub-Saharan African (SSA) countries (Ahmed, 2013; Reinhart & Tokatlidis, 2000). Buttressing this point, the United Nations Development Program (UNDP) 2014 human development Report published not too recent indicates the level of human development of the SSA countries. In this report, South Africa and Ghana are the only countries among the 45 SSA countries that are within the medium human development countries. The remaining SSA countries are in the low human development category. Hence, the present study investigates the effectiveness of liberalization on stock market development and productivity in selected SSA countries. This is done by looking at the influence of liberalization on stock market, Foreign Direct Investment Inflows and the effect of these FDI inflows on Total Factor Productivity for selected SSA.

1.2 Background of Study

Financial liberalization was rejuvenated in the 70s through the seminal works of McKinnon (1973) and Shaw (1973). It is recommended as a better alternative to the financial repression of the economies of the developing countries. Financial repression is a situation where the governments are controlling the costs and the

direction of credits in order to finance the deficits of the governments and also to increase investment levels (Fowowe, 2008). The repression according to McKinnon (1973) and Shaw (1973) henceforth (M-S) leads to low level of savings which also affect negatively the investment levels. M-S view is that capital accumulation falls short of the required quantity which is due to insufficient savings. Savings is positively being influenced by interest rates while investment is a decreasing function of interest rates. Administering the savings rate through financial repression makes the interest rate on savings to be fixed below equilibrium.

This leads to increase in consumption at the expense of savings. It also reduces the average efficiency of investment since low return projects that were not worthwhile under higher interest rates can now be implemented in the presence of financial repression. However, M-S portend that if financial liberalization is introduced in the developing countries, this would make the interest rate to be market determined. Appreciation of interest rate through deregulation of interest rate attracts the much-needed savings that would be directed to investment. The situation increases the average efficiency of investment. Increase in efficiency of investment leads to increase in output and income (Arestis & Caner, 2004). However, analysts are of the opinion that the possibility of increase in interest rate to lead to greater credit availability depends on one salient condition: If the increase in deposits stems from the formerly unproductive assets like jewelries, then this would lead to greater credit availability. On the other hand if the increased in deposits is from the informal sector to the formal sector where the latter is subject to reserve requirements then there may not be higher level of credit availability (Arestis & Caner, 2004).

1.2.1 Overview of Financial Liberalization in selected sub-Saharan African Countries

Various experiences on different liberalization efforts of the developing countries leave much to be desired. In most of these countries, the experiences with financial liberalization have shown mixed results (Ahmed, 2013). While liberalization has been successful in some countries, it has been a dismal failure in others especially in the western part of the SSA countries. Different reasons are adduced for the negative impacts of financial liberalization in SSA economies. Analysts believe the reasons may be due to the difficulty in measuring financial liberalization, the timing and the methodological approach (Ang, 2008; Kaminsky & Schmukler, 2003). Others suggest that indirect benefits accrue from financial liberalization (Ang, 2008; Kose, Prasad, Rogoff, & Wei, 2009). As such, the effects of financial liberalization take a long time to manifest.

When the effects show, they may be through such channels like good quality institutions, strong financial sector development and sound macroeconomic policies (Kose *et al.,* 2009). The liberalization of interest rates and the financial markets in the selected SSA countries are done in phases. Interest rates liberalization in South Africa started in 1972. Directed credit ceilings were abolished in 1972. There was reversal of the abolished credit ceilings in 1976 before it was removed again in 1977 (Odhiambo, 2010). Interest rate was fully liberalized in 1982 (Fowowe, 2013). The liberalization of interest rates in South Africa afforded the banks the opportunity to determine their rates of interests. Real interest rates during the 80s were negative and this was due to high level of inflation. It was in the 1990s that positive real interest rate was achieved in South Africa (Odhiambo, 2010). In 1995, the Stock Exchange

Control Act was enacted in order to modify the ways stocks were traded in South Africa. The act also gives opportunities for foreigners to invest in South African stocks (Yartey, 2008). The liberalization of interest rates has been successful in South Africa (Odhiambo, 2010).

The liberalization of stock market was a partial success. According to Yartey (2008), the success of stock market liberalization in South Africa is consequent upon the strengthening of such quality institutions as political risk, law and order which were not fully in place hitherto. The financial liberalization process in Nigeria was done in phases. Abolishment of directed credit control was done in 1985 (Fowowe, 2013). The Structural Adjustment Program (SAP) of 1987 herald the first phase of financial liberalization in Nigeria. It is the period that the control on interest rate was totally removed. In 1988, the establishment of Foreign Exchange Bureau by private institutions was done. This is in order to take care of excess demand for foreign currencies and to enhance competition in the foreign exchange transactions (Ikhide & Alawode, 2001). The second period is the post structural adjustment period. The Nigerian capital market was deregulated in 1993. Internationalization of the stock exchange in 1995 led to more activities in the stock market.

The internationalization of the stock market is the abolition of laws that constrained foreign participation in the market. It led to greater increased in stock exchange activities to such an extent that the stock market witnessed transactions in foreign portfolio in excess of ₦10.0 billion, excluding foreign investment in banks, in 2005, (Okpara, 2010). The successful implementation of liberalization efforts in Nigeria

was impeded by government's persistence deficits and the inability of the government to maintain exchange rate stabilization (Ikhide & Alawode, 2001). The liberalization period witnessed high level of inflation which forced the government to intermittently reverse the liberalization of interest rates twice. In Kenya, the first interest rate reform was done in 1974 when both the minimum savings and lending rates were reviewed upward by two and one percent respectively. From 1981, based on the recommendation of the International Monetary Fund (IMF), different financial reforms were introduced (Odhiambo, 2009).

From 1981 to 1989, Kenya adopted partial liberalization. The rate of Treasury bill was fully liberalized in 1990. In July 1991, full liberalization of interest rate was embarked upon. By November the same year, exchange control account was partially lifted through the withdrawal of the clause covering declaration of foreign currency held by incoming travelers. More liberalization of foreign exchange was introduced in March 1993. It was actualized through the permission for commercial banks to make payments in foreign currencies for their clients without resorting to Central bank (Ngugi & Kabudo, 1998). October 1993 was the period that the free floating exchange rate was introduced in Kenya. By 1995, foreign investors were allowed to participate partially in the stock market transactions (Ngugi & Kabudo, 1998). The conclusion from the empirical study of Odhiambo (2009) is that interest rate liberalization in Kenya has succeeded in improving the growth rate of Kenya through financial depth.

Aryeetey, Hettige, Nissanke & Steel (1997) suggest that the experience of liberalization efforts in Ghana was successful and crisis free. This according to the authors is because Ghana reduced fiscal deficits over a two-year period before embarking on liberalization. In Ghana the interest rate liberalization started in 1985. As part of Economic Recovery Program, the government introduced a flexible exchange rate policy which led to the devaluation of the cedi in 1982. Gradual process of interest rate liberalization was done in 1987, commercial banks had minimum lending rates removed in 1988 while full liberalization was in 1989 (Fowowe, 2013). In another development Adusei (2013) investigates the relationship between economic growth and financial development in Ghana. The paper finds that there is a negative relationship between both growth and financial development in Ghana. The paper concludes that financial reform does not have positive influence on growth in Ghana. Prior to the establishment of bank of Botswana, the commercial banks operating then freely determined their own interest rates since they were the offshoots of foreign banks.

The establishment of Botswana central bank gives way to the central bank to legislate the rate of interest to such extent that the rate was fixed below that of South Africa. The situation encourages capital outflow. The financial system of Botswana is made up of Bank of Botswana, five commercial banks, two investment banks and some financial institutions such as, the Botswana Savings bank, the Botswana Building Society and some micro-lenders. The Botswana Savings Bank renders both savings and loans services and is mainly funded by the government. By June 2004, the Botswana banking sector composes of five commercial banks (purely foreign owned), two investment banks and other financial institutions. The commercial

banks in Botswana own 38 percent of the total assets of the Botswana financial system and 37 percent of the economy's Gross Domestic Product (GDP) (Odhiambo & Akinboade, 2009). Liberalization which was introduced in 1989 increased competition among the commercial banks. As a result of this, four major commercial banks had 59 branches. Botswana Stock Exchange was formed in 1989 with six registered companies. The local company index of the Botswana Stock Exchange rose from 100 in 1989 to 2394.5 points in 2003. Furthermore, in 2004, a total of 25 companies and 32 securities companies were listed.

In 2005, the non-bank financial intermediaries were responsible for 31.7 percent of the GDP and had over 100 pension funds with 12 insurance companies. In summary the financial system in Botswana is relatively well developed providing 100.7 percent of the economy's GDP compared to 61 percent average for developing countries (Odhiambo & Akinboade, 2009). The francophone countries under which belongs Cote d'Ivoire have a central bank that is controlling all the financial sectors of all the francophone countries: the Central Bank of West African States (BCEAO) of the West African Monetary Union (WAMU). It liberalized interest rates in October, 1989 through the abolition of its preferential discount rates. Interest rate regulation was still being determined by BCEAO (Galbis, 1993). Cote d'Ivoire like all the developing countries started with financial repression after independence. This led to problem of financial crisis and was aggravated in 1987 with high liquidity crisis. In 1990, the country liberalizes its preferential discount rate and accompanied by interest rate deregulations.

The real interest rate in Cote d'Ivoire is still negative in spite of the interest rate de-regulation. Financial liberalization in the country is mainly in the form of restructuring and bank supervision, privatization of banks and the strengthening of the banking supervision (Inanga & Ekpeyong, 2002). Cote d'Ivoire Stock Exchange had been in existence since 1973 prior to financial liberalization. It started with 22 listed companies and increased to 35 in 1997. In 1998 consequent upon liberalization, foreign investors were allowed to participate in the stock market. When the currency was devalued in 1994, market capitalization increased and this continued until 1999 (N'Zue, 2006). Mauritius is one of the countries that went full hog into liberalization. Interest rate was highly liberalized in November 1981. In 1988 the remaining regulation on interest rate which was the minimum rate on savings was removed. Consequent upon liberalization the authorities adopt moral suasion in order to maintain positive real deposit and lending rates. Moreover, an agreement among Mauritius Bankers Association to reduce limits in the rates is another factor influencing the structure of the rate of interest (Galbis, 1993).

Mauritius operates offshore banking system. The offshore banking service in Mauritius include: lending, deposit, foreign exchange dealing, offshore trust and securities and trade finance. In 1999, the banking sector in Mauritius is made up of 10 domestic banks, 10 offshore banks, and seven non-bank financial institutions for authorization to transacting in deposit taking business, two foreign exchange dealers, and three money changers. In July 1989, the Stock Exchange of Mauritius was established (SEM). In 1999, 47 companies were officially listed with a market capitalization of MRs38.4 billion. SEM has been able to reform the domestic investment culture as well as modernize the financial services sector which shore up

its contribution to GDP by about 11 percent in 2001 (Larose, 2003). The foregoing analyses are attempts by different countries (in the SSA) at liberalizing their financial sectors. The issue is the impact of these liberalizations on stock market development.

1.2.2 Interest Rate Liberalization

Interest rate liberalization is one of the focuses of M-S. The reason for this is to allow the interest rate to be market determined in other for the developing countries to attract the necessary funds for investments (Odhiambo, 2010). However, the effectiveness of these efforts can be assessed by looking at the trends in real interest rate among the selected SSA countries. This is done by comparing them with other countries like Malaysia and Philippines as depicted in Figure 1.1.

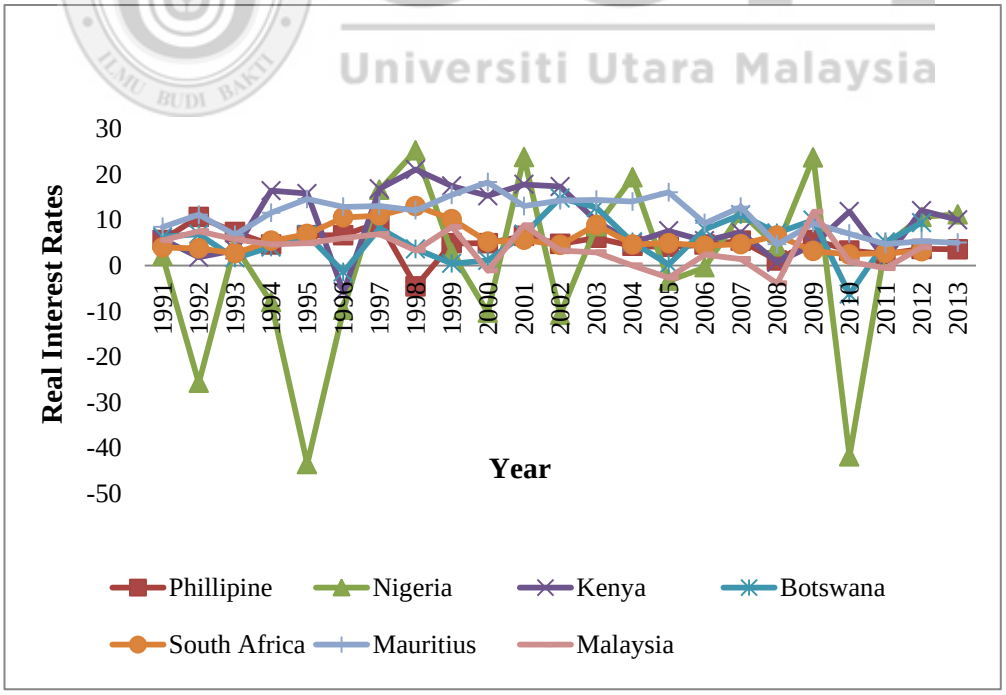

Figure 1.1
The Real Interest Rates in selected SSA countries including Philippines and Malaysia
Source: *World Indicators, 2014.*

The interest rates figure shows that the rates are volatile particularly among the SSA countries. The real interest rate was negative during the early stages of liberalization in 1992, 1995 and 1996. The negative real interest rate became pronounced in the year 2010 for countries like Nigeria, South Africa, and Botswana among the selected SSA countries. The seminal work of McKinnon (1973) and Shaw (1973) provides the impetus for the debate on the important of finance in driving economic growth or the role of growth on finance. The two writers opine that the problems of the developing countries arise from the various governments' intervention in the markets through restrictions and lowering of the interest rates below equilibrium thereby causing financial repression. According to them, the problem of the developing countries is not that of investment demand but that of supply of investible funds to implement these investments. They therefore recommend that the governments of the developing countries should hands off control of interest rates in order for it to be market determined and thus attract the much desired investment funds to promote growth.

However, high interest rates may be inimical to the growth of the informal sectors especially where safety nets are not provided by the governments. The issue of allowing the interest rates to be market determined, analysts suggest may in the end have negative effect on growth (Cobham, 2002; Stiglitz, 2000). This is because when the interest rates are too high, the informal sector which is also driver of the economy is at times edged out of getting credit facilities. Liberalization of interest rates in the SSA countries succeeded mainly in increasing the lending rates as against the deposit rates.

While the lending rates increased on a relatively high level in the respective countries, the increased in deposit rates were not enough to substantially shore up the domestic savings as shown in the savings figure to be shown in the latter part of the study. This explains the reason for the wide gap between the lending and the deposit rates that is the interest rate spread. The higher the interest rate spread the lower the rate of growth of income as stated by (Fowowe, 2013). Evidence of high interest rate spread between the lending and deposit rates among the SSA countries in comparison with Philippines and Malaysia is shown in Table 1.1 High level of interest rate spread is noticed in Table 1.1 in comparison with two other countries in Asia (Malaysia and Philippines).

Table 1.1
*Interest Rate Spread among the Selected SSA Countries in Comparison with Philippines and Malays*ia

Year	BTSW	KEN	MART	NIG	SAF	MALS	PILP
			Interest Rate Spread				
2001	5.7	13.0	11.3	8.2	4.4	3.8	3.7
2002	5.8	12.9	11.1	8.1	4.9	3.3	4.5
2003	6.5	12.4	11.5	6.5	5.2	3.2	4.3
2004	5.9	10.1	12.9	5.5	4.7	3.0	3.9
2005	6.5	7.8	13.8	7.4	4.6	2.9	4.6
2006	7.6	8.5	11.5	7.2	4.0	3.3	4.5
2007	7.6	8.2	10.1	6.7	4.0	3.2	4.9
2008	7.9	8.7	1.4	3.5	3.5	2.9	4.3
2009	6.3	8.8	0.8	5.1	3.2	3.0	5.8
2010	5.9	9.8	0.5	11.1	3.4	2.5	4.5
2011	5.9	9.4	1.8	10.3	3.3	2.0	3.3
2012	7.4	8.2	2.4	8.4	3.3	1.8	2.5
2013	7.1	8.7	1.7	8.8	3.4	1.6	4.1

Source: *World Development Indicators, 2014*

The wide gap between deposits and lending rates may be a manifestation of the fact that interest rate liberalization was not effective in the selected SSA countries. It merely results to the situation where lending rates are growing much higher than the deposits rates. High level of interest rate spread does not indicate better development of the stock market neither does it lead to more foreign investment inflow. Following the interest rates liberalization, the real interest rates in some of the SSA countries, particularly Kenya, Nigeria and Uganda, rose and this might have given rise to financial crises (Calvo & Reinhart, 1999). In most countries in SSA the financial liberalization were embarked upon prematurely without given cognizance to the imperfect nature of SSA financial markets. Corroborating this point, Calvo and Reinhart (1999) observe that 13 out of 16 countries that adopted financial liberalization from 1980 to 1995 in the SSA countries had financial crisis. The statistics of different countries with financial crises is presented in Table 1.2.

Table 1.2
Financial Crisis

Country	**Years of Crisis**	**Type of Crisis**
Benin	1988-90	80% of bank loans was non performing, total loss was 17% of GDP
Cote d'Ivoire	1988-91	4 big banks affected accounted for 90% of banking systems crisis
Ghana	1982-89	7 out of 11 audited banks became insolvent
Guinea	1985	6 banks became insolvent accounting for 99% of total system deposit
Mauritania	1984-93	5 major banks had non-performing assets ranging from 45% - 70% of portfolio
Mozambique	1987-96	BCM main commercial bank experiences solvency problem
Nigeria	1990s	In 1995 almost half of the banks are reported to be in financial crisis
Senegal	1988-91	6 commercial banks and 1 development bank closed due to crisis
South Africa	1977	Trust bank became insolvent
Tanzania	1991	1987 the main commercial banks had losses up to half of their portfolios
Uganda	1994	50% of banking system face solvency problem
Zambia	1995	Meridian bank became insolvent which accounted for 13% of commercial bank assets
Kenya	1985-89	4 banks and 24 non-bank financial institution faced with liquidity and solvency problems

Adopted from Calvo & Reinhart (1999)

One of the channels by which the interest rate affects productivity of capital is that higher yields on financial assets divert savings from low yielding, self-finance investment to the acquisition of financial assets. The additional financial savings is allocated by financial intermediaries to the more productive sectors; higher interest rate would improve the average efficiency of investment (Sundararajan, 1987). Moreover the channel of transmission of interest rate liberalization to portfolio capital inflow is that the liberalizing country interest rate must be higher than the world interest rate for the liberalizing country to be able to attract foreigners to participate in the domestic economy's stock market (Henry, 2000). At the end of the day more capital flows into the liberalizing countries. On the inflows of Foreign Direct Investment, these are attracted by higher return on investments among other factors.

Higher return on investment encourages the foreign investors to locate plant in the domestic economies thereby improving technological transfer as well as inflows of foreign investment. Another transmission mechanism through which interest rate affects stock market is via the financial structures of the different companies in the countries. This is where interest rates operate through the cost of capital to the investors and through returns to various groups of savers. A change in interest rates affects the debt-equity choice of firms, real interest rates and overall costs of capital. It sets in motion different reactions influencing the desired level of the capital stock and its productivity (Omole & Falokun, 1999).

The region of SSA has witnessed different changes of governments, inefficiency in the management of the economies coupled with low income levels. All these culminate into low levels of financial development that leads to low growth levels. The different dates that interest rates are liberalized in the respective SSA nations are presented in Table 1.3. In the table South Africa is the first to experience interest liberalization in 1972 followed by Kenya. It is followed by Mauritius and Ghana while Botswana and Cote d'Ivoire are the last to liberalize their interest rates in 1989.

Table 1.3
Different dates of Interest Rate Liberalization in Selected SSA Countries

Country	1st Stage Lib	2nd Stage Lib	3rd Stage Lib	Source
Botswana	1989	1991	nil	Fowowe (2013)
Cote d'ivoire	1989	Full lib in 1993	nil	Galbis (1993); Fowowe (2013)
Ghana	1985	Gradual in1987	Full lending rates in 1989	Fowowe (2013)
Kenya	1974	Partial lib between 1981-89	Full liberalization in 1991.	Odhiambo (2009)
Mauritius	1981 more lib	1988 liberaliz remaining part	nil	Galbis (1993)
Nigeria	1987	1989	nil	Galbis (1993); Fowowe (2013)
South Africa	1972 full lib	nil	nil	Fowowe (2013)

1.2.3 Stock Market Development in the Sub-Saharan African Countries

Prior to the 1980s, the stock market in SSA was both underdeveloped and unknown. Beside South Africa, the other SSA countries had relatively underdeveloped stock markets. Stock trading occurred only in a few stocks which account for a greater number of total market capitalization (Yartey & Adjasi, 2007). This may be attributable to the fact that most of these SSA countries were poor and underdeveloped. Hence, the awareness on the important contributions of stock markets to economic development was not there then. The poverty level leads to low

income. Low income translates to low savings and low investment in stock markets (Kagochi, Nasser & Kebede, 2013). Inanga and Emenuga (1997) in strengthening the issue of low stock market development as measured in indices of stock market analyze the trend in stock market indices among some developing countries.

This is done by comparing the stock market indices in the developing countries with Nigeria and Zimbabwe from 1986 to 1993. In that study the two SSA countries Nigeria and Zimbabwe perform low in terms of the stock market indices rating among the developing countries in the analyses. Stock market concentration which measures the extent at which capitalization of stocks are concentrated in the large but few dominant firms shows Nigeria rating low among the other countries. It shows the shares of top ten corporations in market capitalization. Market concentration rating was: Nigeria (48.00), Turkey (45.60), Jordan (44.00) and India (19.00). Furthermore, the statistics on number of listed companies for the period 1986-1993 rates the SSA countries on the low side in comparison to other countries. Nigeria stock market in terms of number of listed securities is 4.89 percent; Turkey is 35.0 percent; India is 21.33 percent and Zimbabwe is 2.12 percent.

On turnover ratio, the SSA countries in the list are the worst performers. India had 54.51 percent, Turkey had 39.16 percent, Jordan was 22.76 percent, Zimbabwe was 3.83 percent and Nigeria had 1.84 percent. The low turnover ratio feature of the SSA stock markets is as a result of low volume of trading and deficient pricing mechanism. Furthermore, indicators of stock market development proxy by listed securities show that there are few listed companies. The Figure 1.2 shows the paltry

situation of the stock markets in SSA compared with other countries like Malaysia and Thailand.

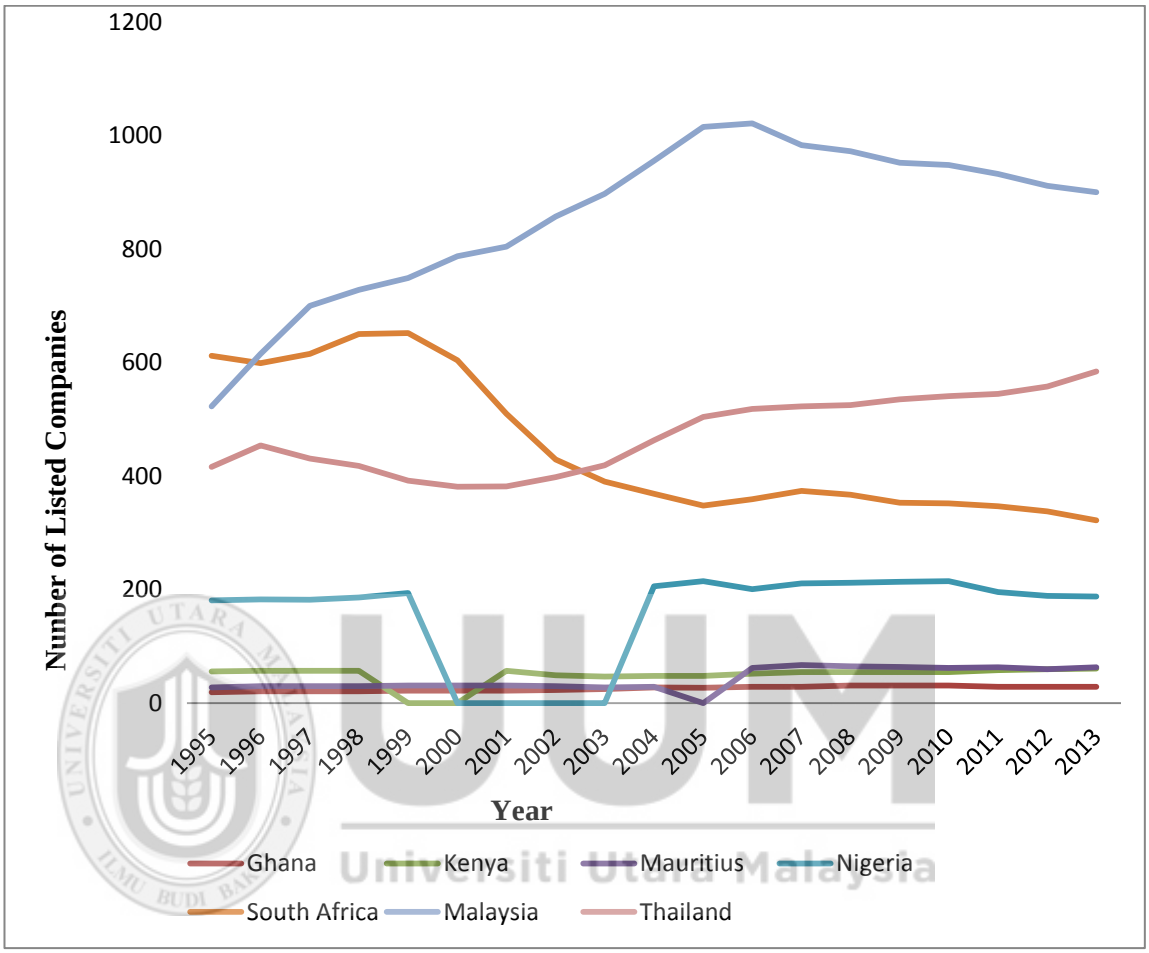

Figure 1.2
Number of Listed Companies in Selected SSA Countries in Comparison with Malaysia and Thailand
Source: *World Indicators, 2014.*

It must be mentioned here however that South Africa is different among the whole SSA region. This is because it is better developed than the other SSA countries. Figure 1.2 indicates that none of the SSA countries except, South Africa had up to 250 numbers of listed companies for the period under review. The SSA economies in the group (aside South Africa and Nigeria) individually have less than 70 numbers of listed securities. The situation is comparable to Thailand where the minimum

numbers is 380 and for Malaysia the minimum is 520. Other means of evaluating the low levels of development of the stock market is through the indices of stock market such as market capitalization, stock value traded, turnover ratio and concentration of the stocks (in form of capitalization) in large but few dominant firms. The same low trend is applicable to turnover ratio and market concentration. Market concentration is high in most SSA countries. Evidence of thick concentration is found in such places like Ghana and Abidjan. From 1995 to 2000 the Ashanti goldfields controlled 90% of the entire market capitalization of Ghana. Also only five companies are in control of 75% of market transactions in Abidjan (Allen, Otchere & Senbet, 2011). The low levels of stock market developments in most SSA countries can be shown through the statistics of stock markets like market capitalization, value traded, and turnover ratio. These are the measurements of size, volume of trading and liquidity of the stock markets respectively.

Table 1.4 shows the average indices of market capitalization, value traded and turnover ratio (that represent stock market development for the present study). The statistics represent the average values during the period 2007-2012 for individual countries in the selected SSA countries, Thailand and Malaysia. The statistics reveal the paltry situation in which SSA countries stock markets are even years after liberalization of the stock markets. It must be highlighted here that South Africa is different among the other economies in the SSA. This is because the country has undergone unofficial liberalization years before the countries in the SSA. Foreigners have been trading on Johannesburg Stock Exchange long before the official liberalization was announced. The apartheid regime stalls this development when the world put a sanction on business relationship with South Africa. Also the South

African stock market has undergone series of institutional reforms unlike the other countries in the SSA. The country that has the highest value in market capitalization scaled by GDP among the five SSA nations (without South Africa) is Mauritius with a ratio of 72.79 percent. This is followed by Kenya with the ratio of market capitalization of 29.09 percent. The situation can be compared with Malaysia that has a market capitalization ratio of 139.07 percent during the same period. The statistics in Table 1.4 is a manifestation of the low state of development of the stock markets of the SSA after liberalization of these exchanges. Statistics on Turnover ratio is also very low. The highest value of the Turnover ratio is from Nigeria which is 16.49 percent. The next country after Nigeria is Kenya with 7.34 percent. This can be compared with Thailand with 75.52 percent and Malaysia that has 34.41 percent during the same period.

Table 1.4
Average Values of Stock Market Indices (from 2007-2012) for selected SSA in Comparison with Thailand and Malaysia

Countries	**Market cap. as ratio of GDP (in percentage)**	**Stock Turnover Ratio (in percentage)**	**Stock Value Traded Ratio (in percentage)**
Cote d'Ivoire	28.27	2.6	0.84
Ghana	8.75	7.15	0.5
Kenya	29.09	7.34	2.05
Mauritius	72.79	5.53	3.93
Nigeria	21.41	16.49	4.05
South Africa	229.86	30.64	69.23
Malaysia	139.07	34.41	47.26
Thailand	70.87	75.52	51.28

Source: *World Development Indicators 2014.*

The different days that the stock markets of the selected SSA countries liberalize their stock markets are depicted in the Table 1.5. Nigeria was the first country to liberalize its stock market. It was followed by South Africa which faced stiff

sanctions from the world community based on its apartheid regime. When the sanction was lifted in 1991 more foreigners participated in South African stock market.

Table 1.5
Dates of Stock Market Liberalization of Selected SSA Countries

Country	Date of Stock Market Establishment	1ST Lib.	Further Lib.	Source
Botswana	1989	2004	nil	Irvin, J. (2005)
Cote d'ivoire	1973	1998	nil	Owusu and Odhiambo (2013)
Ghana	1989	1994	nil	Adam,and Tweneboah, (2008)
Kenya	1953	1995	1997	Irvin, J. (2005); Ngugi and Kabudo (1998)
Mauritius	1989	1994	nil	Irvin, J. (2005)
Nigeria	1960	1993	1995	The Nigerian Stock Exchange
South Africa	1887	1995	nil	Makina and Negash (2005); Yartey (2008)

1.2.4 Mechanism of Transmission between Stock market Liberalization and Stock market Development

The development of the stock market can be viewed from such indices as market capitalization as a percentage of GDP; value of stock traded as a percentage of GDP; turnover ratio; volatility of the stock market and market concentration (El-Wassal, 2013). However, taking into cognizance the problem of data, the present study would focus on the indices of market size for measuring the development of the stock market. Liberalization of the stock market entails a larger and more liquid stock market. This is due to the fact that liberalizing the stock market attracts foreign

participation into the domestic stock market. More foreign participation implies that more transactions in form of larger volume of shares are traded on the exchange which tends to expand the size and liquidity of the market (Henry, 2000; Braifu-Insaidoo, 2013).

The larger the size and liquidity of the stock market coupled with other indices of the stock market the more developed the stock market (El-Wassal, 2013). The reduction of liquidity risk of investors through the capital market is another mechanism by which stock market liberalization affects stock market development. Bencivenga, Smith & Starr (1996) referring to Hicks (1969) state that the British industrial revolution of the eighteen century was spurred by capital market liquidity. According to Hicks, the industrial revolution had occurred earlier in the past but was delayed for financial revolution in form of liquid capital market before the industrial revolution become manifest. Investors in capital markets can always hold liquid assets like equity, bonds and demand deposits that they can quickly sell if they require access to their funds. Capital markets transfer these liquid financial instruments into long-term capital investments (Levine, 2005).

In spite of the foregoing development, there have been real improvements in the SSA stock markets. Such stock exchanges as Mozambique, Uganda, Ghana, and Nigeria have been performing remarkably well. For instance Ghana's Exchange was rated as the world's best performing stock market for 2004 with a year's return of 144 percent in US dollars compared with 30 percent return by Morgan Stanley Capital International Global Index. Furthermore within the SSA region four other stock

markets – Uganda, Kenya, Mauritius, and Nigeria were among the best market performers in the year (Adjasi & Biekpe, 2006; Yartey & Adjasi, 2007).

1.2.5 Foreign Direct Investment Inflows

The crucial role of Foreign Direct Investment (FDI) inflows in enhancing growth in the nascent economies of the SSA cannot be overemphasized. It can promote spillovers to local firms in such a way that productivity in local firms can be improved. This is achievable by the local firms copying of the advanced technology method of the foreign investors. Furthermore through the provision of varieties of goods, the consumers in the recipient countries are also afforded more opportunities of varieties of consumption goods. FDI has become a major source of finance of external trade for the developing economies. Foreign investment is supposed to be growth-promoting through the introduction of new inputs and modern technology in the production function of the local firms.

In addition to this the manpower training ability of the foreign investors would upgrade the skill of the human development of the local industries. Hence foreign investment is growth-inducing through two channels. First is the introduction and importation of new inputs in the production function of the domestic companies thereby increasing the capital stock. The second is the upgrading of human development skill through training of the local manpower (De Mello, 1999). The nascent countries' growth rates are partly determined by the imitation of the modern technology of the advanced countries. Hence the development rate of the developing countries depends on the extent of the adoption, assimilation and implementation of

the advanced countries 'modern technology. One of the necessary conditions for FDI to contribute to growth is through the efficient financial markets. The development of the domestic financial market can influence the extent to which the local industries can take advantage of the spillovers from the foreign industries.

Efficiency of the domestic financial market entails that the local entrepreneurs have access to better funds in order to carry out their entrepreneurial abilities (Alfaro, Chanda, Kalemli-Ozcan & Sayek, 2004). This is referred to as one of the absorptive capacity that is necessary for efficient functioning of the FDI. The trends in foreign investment inflows to the economies of SSA show that the region is not particularly favoured in the destination of FDI inflows. During the period 1980-89 and 1990-99, FDI inflows to the region of SSA grew by 218 percent; for Latin America it was 560 percent; East Asia was 990 percent; and for South Asia it was 760 percent (Asiedu, 2004). Moreover SSA countries 'contribution to FDI inflows in 2000-2010 among the developing countries was a paltry 7.1 percent.

Even within the SSA region the inflows have been more tilted towards the resource-rich countries of Angola, Nigeria and South Africa (Asiedu, 2006). Notwithstanding the foregoing however, FDI inflows to the region have improved in recent times. Average annual inflows of FDI to the region were US$1.3 billion in the period of 1980. The amount rose to US$4.78 billion in the 1990s and US$27.47 billion in 2000-2010 (Michalowski, 2012). Statistics of trends on FDI inflows to SSA region is low compared to some countries within the same level of development as shown in Figure1.3.

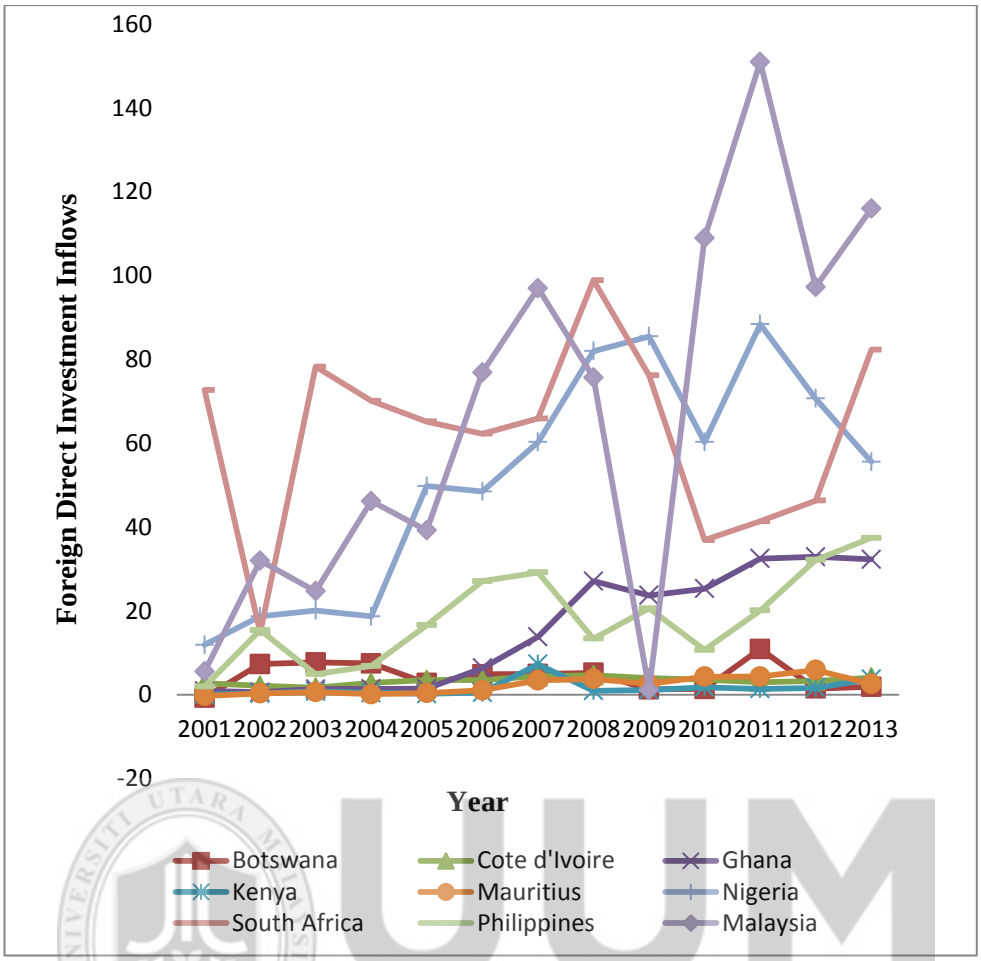

Figure 1.3
FDI Inflows in Selected SSA Compared with Philippines and Malaysia
Source: *World Development Indicators*

1.2.6 Institutional Quality

Institutional quality is a wide concept that can be viewed from the perspective of political and economic institutions. Political institutions are such factors as political stability, supervisory and regulatory framework, and entrenchment of property rights and enforcement of the rule of law among others. Economic aspects of institutions is seen as the reduction in corruption (which affects entrepreneurial ability to innovate) (Rivera-Batiz, 2002), entrenchment of property rights in order to protect the shareholders' interests so as to build up confidence to encourage them to invest in the economy. Moreover, the provision of strong regulatory framework is crucial for

nurturing the stock markets. In addition to providing the legal framework is its supervision and enforcements to enhance the developments of the stock markets (Asongu, 2012; El-Wassal, 2013).

The enforcement of the law ensures that the judicial processes are put in place to implement the laws thereby instilling foreign investors' confidence in the polity. Societies with good institutions are able to promote investments in machinery and investment in human education while at the same time upholding the rule of law and this leads to prosperity. On the other hand societies with poor institutions in terms of non-enforcement of rule of law, where the elites have extraordinary powers to infringe on individual's rights is regarded as poor institution societies (Acemoglu, 2003). This view is corroborated by Abu, Abd Karim and Aziz (2015) who in their analysis of institutions find that political instability and corruption in the Economic Community of West African States (ECOWAS) region are responsible for low levels of economic growth in the region. ECOWAS constitutes the substantial part of the SSA member countries.

Different armed bandits have been on the increase in the western part of the SSA region since 1990 in such areas as Sierra Leone, Guinea-Bissau, and Mali. Recently the menace of the Boko-Haram in Nigeria has been frustrating efforts of governments at liberalizing the stock market in that country. The effects of quality institutions proxy by corruption in reducing economic development is also stressed by Abu *et al.* (2015) that pointed to the case of former military rulers in Nigeria that have been accused of stealing US$12 billion oil windfall. In Guinea Bissau top

military officers have been accused of legalizing corruption. The consequence of all these is that investors are deterred from staking their funds in such environment characterized by poor institutions.

Weak regulatory and supervisory lapses are discovered on the part of the authorities thus leading to reduced confidence of investors in the stock markets (Yartey & Adjasi, 2007). Liberalization entails less restrictions and reduced control. Less control or restrictions can be applied in the developed world where strong institutions like supervisory and regulatory framework are already in place, not in the developing countries where these controls are not adequate or in place (Singh, 1998). Singh opines that liberalization without strong institutions is partly responsible for the Asian crisis of 1997. The country that adopted partial control like India was not so much hit by the crisis as country like Indonesia that went full hog into liberalization.

The poor performance of stock market indicators is attributed to inadequate stock market infrastructural facilities. The developed countries that have embarked on liberalization long before the striving developing countries are still plagued with the problem of information asymmetry hence the problem of quality institutions is not peculiar to the developing countries (Singh, 1997). In a nutshell poor institutions that are prevalent in SSA region is adduced for the low levels of development of the stock markets. Also the same poor institution is responsible for the inefficient implementation of policies like liberalization to achieve the desired objectives (Stiglitz, 2002).

1.2.7 Mechanism of transmission between Financial Liberalization and FDI Inflows

Financial liberalization is the removal of controls on financial markets in particular to the ability of financial institutions to set their own interest rates and choose their own lending recipients (Cobham, 2002). Financial liberalization must be distinguished from financial development. Financial liberalization is the process of gradual removal of restrictions in international capital flows, while financial development refers to the upgrading of domestic financial markets (Gehringer, 2013). Better financial liberalization should contribute to higher degree of competition within the domestic financial market. Financial liberalization as mentioned above is a multidimensional concept which includes domestic financial liberalization, capital account liberalization and stock market liberalization. Domestic financial liberalization, which is the first type of financial liberalization, is a move by the domestic economy to partially or totally remove control on interest rates; remove selective credit to particular sectors and reserves requirements by the financial sectors.

It also includes allowing foreigners to participate in investment in the domestic banks (Kaminsky & Schmukler, 2003). The second type of financial liberalization is the capital account liberalization that entails the removal of restrictions on the local citizens' participation in international financial transactions. It also includes removal of controls on foreigner's involvement in financial transactions in the domestic economy. Specifically it allows domestic individuals, banks and firms opportunities to access foreign loans. In the same manner, foreign banks and individuals are also allowed to borrow from the domestic banks while controls on inflows of foreign

capital into the country are removed (Arestis & Caner, 2004). Capital account liberalization is also the removal of restrictions on foreigners' investment in any sector of the economy (Cobham, 2002).The third type of financial liberalization is stock market liberalization. It is a situation where foreigners are given permission to partake in the domestic economy's stock markets. The local investors are also allowed to invest in foreign equities outside the domestic economies (Henry, 2000). The link between domestic financial liberalization and foreign investment inflow can be seen from the fact that liberalizing the domestic financial sector with entrenchment of good quality institutions make it possible for foreigners to be able to participate in both bank and stock market units of the financial sector.

This paves ways for foreigners to invest more in the domestic economy thereby boosting foreign investment inflows. Studies have shown linkage between interest rate liberalization and foreign investment. The increase in foreign investment in the domestic economy is triggered by the attractive interest rates. The situation leads to increase in FDI inflows with confident building up in the return on their investments. For the purpose of this study however the focus is on liberalization of interest rates and the stock markets with the impact of interest rate liberalization on FDI inflows rather than the entire liberalization of the whole financial markets. Another means of transmission from stock market liberalization to foreign investment is that well-functioning financial markets through the capital market which provides liquidity and access to funds. This gives opportunities to the local firms to imitate and assimilate the technology from the foreign investors. The neo-liberalists are of the views that removal of restrictions on interest rates would lead to high savings rates.

Experience as shown through statistics as depicted in Figure 1.4 however did not corroborate this assertion. This is shown more vividly in the real domestic savings of some selected SSA countries (years after the interest rates were liberalized). Apart from South Africa where the domestic savings rate rose, and probably in Nigeria where the savings was volatile, the other selected SSA countries' domestic savings were low in contradiction to M-S's postulation.

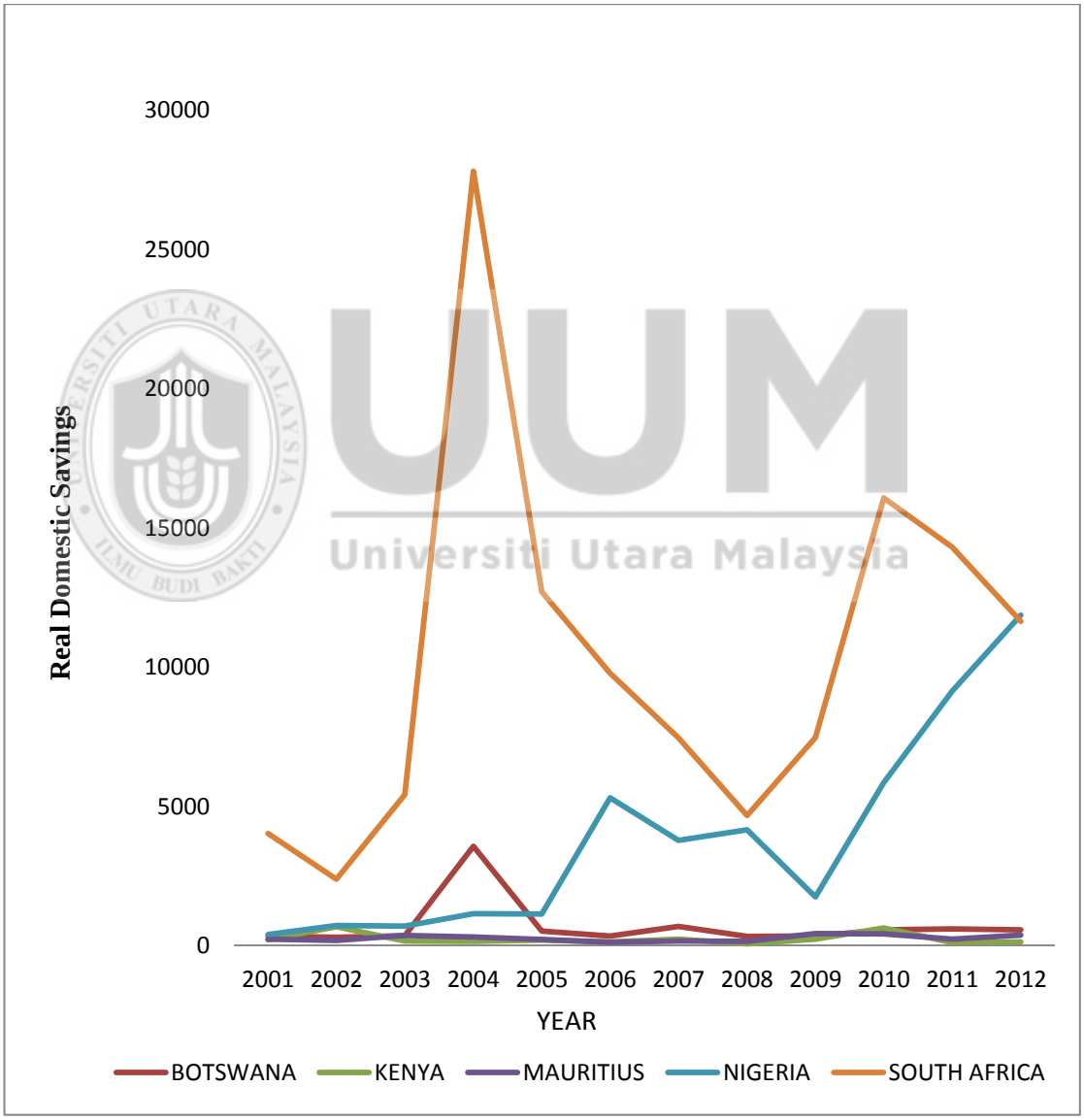

Figure 1.4
Real Gross Domestic Savings (In millions of current US $)
Source: *World Development Indicators, 2014.*

1.2.8 Effects of FDI Inflows on Total Factor Productivity

The traditional model of growth leaves part of the observe productivity growth unexplained. Researches into the determinants of growth have divided the sources of growth into both factor accumulation and productivity change. Productivity change is referred to as the 'Solow residual' 'real cost reduction' or 'Total Factor Productivity' (Harberger, 1998; Hulten, 2001). The change in productivity can be decomposed into both technological change and technical efficiency. Technological progress or innovation is the change in the best practice production frontier. The other aspect of productivity change such as managerial efficiency, learning by doing and short run adjustment to external shocks are referred to as technical efficiency (Nadiri, 1970; Nishimizu & Page, 1982). Traditional measure of total factor productivity rarely discerns between changes in technical efficiency and technological progress.

The two concepts are however different especially for policy interpretation. Technical progress is the result of innovation or invention of new technology by firms. Technical progress shifts the production possibility boundary of an economy. Technical efficiency is the efficient means by which the factors of production are combined in the process of production. It can also be referred to as 'imitation' of the best practice technology. Total Factor Productivity henceforth (TFP) is the combination of both technical progress and change in technical efficiency. It is possible for an economy to experience both high level of technical progress with a combination of declining level of technical efficiency. This may be as a result of inability to achieve technical efficiency in the method of production and it may result into either low or negative TFP growth (Fare, Grosskopf, Norris & Zhang, 1994). Mention must be made of the fact that countries or companies with innovative minds

but negative TFP at times fight back to retain their stronghold but eventually may still not win in spite of the trials (Harberger, 1998).

Furthermore low rate of technical progress can co-exist with high rate of technical efficiency. This is possible where the imitating country is able to efficiently cut cost organize efficient means of production irrespective of the fact that they lack innovation. Policy action of improving TFP can be divided into two: policy directed towards technological innovation and policy of improving technical efficiency. The situation may occur that necessitates a TFP change that would require policy implementation to improve innovation. If this policy for improvement of innovation is directed towards another situation where management of technical efficiency is the solution, then this would lead to policy mismatch. The objective of increasing the TFP might not be achieved (Nishimizu & Page, 1982). It has also been established that part of the link to attaining this technical change is through foreign direct investment. The link between technical knowledge and productivity has been highlighted in the literature. Technical knowledge can be acquired through either research and development or scientific discovery. The embodiment of the scientific discovery in an organizational structure and new equipment entail better quality at reduced costs and this eventually increase productivity (Nadiri, 1970).

The knowledge of best practice technology production frontier or idea gap is crucial for the developing countries. This is because it enables them to know how far off from the gap they are and how fast they can reach it through 'imitation'. Considering the low levels of development of the less developed nations, it has been proven

(Arisoy, 2012; Nishimizu & Page, 1982) that they can attain high productivity gain or TFP improvement through technical efficiency. TFP can either be technically efficient or inefficient. It would be technical inefficiency when countries are far off from the best practice production frontier, in such case the estimated TFP value might be negative. Studies have shown that some countries in the SSA region have negative TFP (Collins & Bosworth, 1996; Senhadji, 2000). The argument goes that some low income African countries that exhibit increasing returns to capital and labour in their production function estimates should ordinarily have high growth rates and high TFP. However the empirical analyses conducted by Miller and Upadhyay (2002), Senhandji (2000) indicate contrary results where some of these countries have negative TFP even with increasing returns to factors. The authors justify the results on the basis that poor institutions and reduced level of FDI inflows are some of the reasons behind the inability of realization of positive TFP even with high capital elasticity in Africa and other low income countries. This is corroborated by Sachs, McArthur, Schmidt-Traub, Kruk, Bahadur, Faye & McCord, (2004) that opine that the high marginal productivity of capital in the developing country is not manifested in the SSA region.

This is because factory production requires basic facilities in form of electricity, infrastructure, educated workforce that would lubricate capital to be able to increase production. All these facilities and infrastructures are in short supply in the SSA region. In corroborating this view Baier, Dwyer, & Tamura (2004) posit that negative TFP might be the result of poor institutions like political instability, lack of openness rather than the results of low technology. The issue of examining the link between FDI and TFP in the selected SSA is therefore imperative. This can be done by

analyzing the desirability of FDI. Desirability of FDI can be examined by investigating its long run effect on productivity. Hence the effect of FDI inflow on productivity is examined. De Mello (1997) in an empirical analysis concludes that the low income countries are not able to benefit from foreign investment because they lack the absorptive capacities to imitate the advanced countries technology. The implication of this is that lack of absorptive capacities on the part of the low income countries would inhibit the chance of FDI inflow leading to technical efficiency for these countries.

1.3 Statement of the Problem

Since the majority of the citizens of SSA are poor, their income levels are low, one wonder how the liberalizing policy can encourage more savings from the citizens out of their meager incomes for investments in the stock markets. The low levels of incomes are even made more exacerbated by the fact that the cost of borrowing is high due to the high levels of interest rates. The struggling informal sectors are edged out of the credit facilities by being made to compete with stronger foreign investors for credits. Coming down to the actual performances of the SSA stock markets, it is discovered that the performance is low in comparison with the other regions of the world. The picture is more vividly described in the research work of (Solarin & Dahalan, 2014).

The average value of the whole of the SSA market capitalization as a percentage of GDP (excluding South Africa) is 13.62 percent from 1990-1999. This poses a question for the stock market liberalization proponents. For comparison over the same period, the average market capitalization as a percentage of GDP for Malaysia

alone is 184.71 percent while for South Africa alone the figure stood at 142.95 percent. Turnover ratio for the whole of selected SSA countries (excluding South Africa) for the same period is 5.58 percent while that of Malaysia alone is 51.55 percent, for South Africa, it is 13.13 percent. Regarding the period 2000-2009, the market capitalization as a percentage of GDP for the entire selected SSA countries minus that of South Africa is 33.21 percent that of Malaysia is 151.57 percent, and South Africa is 216.93 percent.

The average turnover ratio during these later years for the total of selected SSA countries stood at 4.37 percent, while for Malaysia the figure is 47.17 percent, for only South Africa it is 46.49 percent. The reason why South Africa's statistics are separated from the remaining SSA countries is to drive home two points. First is to show the dominance position that the South Africa stock exchange occupies among the others in the SSA countries. Secondly, to bring out the paltry situation in which the SSA stock markets are even after liberalization of their stock markets.

However, Stiglitz (2002), in opposing the views of the liberalization proponents (that capital market liberalization leads to growth), stated that growth is related to investment activities, to new and old enterprises expanding. Such investments cannot be based on speculative activities on money that can come in and out of a country on a moment's notice. The above statement of Stiglitz is what became manifest during the 2008 financial crisis in most of the SSA countries. For example in Nigeria, from January to December 2008, the All-share-index fell from an unprecedented high of 66,121.93 points in the first week of March to 29,551.84 points reducing by 48.1 per

cent. The market capitalization during the same period went down from ₦12.6 trillion to ₦6.5 trillion loosing ₦6.06 trillion in ten months (Nwude, 2012).

In South Africa, market capitalization as a percentage of the GDP fell from 291.28 percent in 2007 to 179.86 percent in 2008. Although it rose to 248.19 percent in 2009, before another persistent fall from 2010 to 2012. The statistics shows that it fell to 174.91 percent in 2010; 130.16 percent in 2011 and 159.31 percent in 2012. Also in Mauritius the same drastic fall in market capitalization was experienced from 2007 to 2009. The total market capitalization as a percentage of GDP in Mauritius fell from 72.71 percent in 2007 to 35.71 percent in 2008 before picking up slightly to 53.64 percent in 2009.

In Ghana, it dipped from 11.6 percent in 2006 to 9.61 percent in 2007, it picked up slightly in 2008 to 11.89 percent before plunging down again in 2009 to 9.65 percent and further down to 7.83 percent in 2011. (World Bank Indicators, 2007-2012). Comparing this fall in market capitalization, with other countries of the world, one would notice that the fall in SSA countries is not only deep in form of scale, it is also prolonged. While some other countries are able to get back on track early after the crash, it took some SSA countries longer time to recover. Calvo and Reinhart (1999) posit that majority of the SSA countries, except South Africa; have stock market infrastructural deficits that are necessary for the thriving of stock markets.

The inflow of foreign investment to the selected SSA has not been encouraging compared to some other countries in developing countries such as Malaysia. In 2002

the value of FDI inflow to Malaysia was $3.2b. rose slightly to $4.6b in 2004; in 2007 it was $7.7b; $10.8b in 2010; and finally in 2013 was $11b.In Nigeria the FDI inflow was $1.1b in 2002; 2004 it was $1.8b; it rose to $6.0b in 2007; maintained the same $6.0b in 2010 and dropped to $5.4b in 2013. In South Africa, FDI inflow was $1.4b in the year 2002; rose to $7.0b in 2004; it was $6.5b in 2007; it dropped to $4.6 in 2010 and rose again to $8.2b in 2013 (WDI 2013). The picture on FDI inflow is more vividly shown in Figure 1.4. Leaving aside the individual countries and considering the entire Africa region as a whole, the African region has not been a recipient of foreign investment inflows for some periods. The flow of FDI to Africa falls by 19 percent from US$72 billion in 2008 to US$59 billion in 2009. Africa region is behind all other regions of the world in the recipient of FDI inflows. In 1990, Africa's share of foreign investment inflow was 1.37 percent in relation to Asia's 10.9 percent. In 2009 while Asia received 27 percent of the world FDI inflow Africa got 5.27 percent (Anyanwu, 2011).

Several institutional bottlenecks in SSA region might have been responsible for low performances of SSA stock markets. Such bottlenecks that include political upheavals and economic crises in form of high corruption have been deterring foreign investors from investment in the region despite policies at stock market liberalization (Asongu, 2012). Notable among such problems are: the 2007/2008 post-election crises in Kenya; Nigeria's stalled transition of June 1993; the economic downturn in Zimbabwe and the not too recent coups in Guinea-Bissau and Mali. Buttressing the point on corruption, Abu *et al.* (2015) state that corruption costs Africa US$150 billion per year in relation to US$22.5billion that was given as aid to

SSA in 2008 by the industrial countries. All these are weak institutions that are bad influences on the development of stock markets in the SSA region.

Low levels of incomes in the SSA countries is emphasized by Asiedu (2006) who points out that 23 out of 47 countries in the region of SSA have GDP of less than US$3b. In 2002, the total GDP of SSA excluding South Africa was US$214b. This amount was equal almost one quarter of Brazilian GDP and almost half of Mexican GDP. In addition to this, the average GDP per capita growth rate from 1961-2000 was 0.45 percent for SSA region, it was 1.6 percent for Latin America and the Caribbean; it was 4.9 percent for East Asia and the Pacific while it was 2.3 percent for South Asia. The implication here is that the growth rate of the SSA region is too low and is manifested in the negative TFP experience of some of these countries thereby justifying the investigation of effects of FDI on TFP for some of the SSA nations. Importance of institution on productivity is reflected in the fact that bad governments in form of political instability can lead to low FDI inflow as well as negative TFP.

In an analysis conducted by Senhadji (2000) for the period 1960 to 1994, the average growth in per capita output of the SSA region is the lowest among other developing countries. SSA growth of TFP was -0.56; East Asia was 0.28 and South Asia was 0.55 during the period of analysis. Similarly, in a panel dataset that spans 1960 to 1989, Miller and Upadhyay (2002) find evidence of negative TFP for the countries in the African region. Average TFP for Africa region decreases over the period of analysis and negative TFP growth of -0.63 is recorded for the region. The figure

constitute the lowest even among the developing countries. In the same manner, Collins and Bosworth (1996) in an analysis of 88 industrial and developing countries for the period 1960-1994 find that SSA countries have negative TFP among the other regions of the world in the analysis. The overall conclusion from all these analyses is that low capital accumulation, low level of human development and weak institutions are responsible for the negative TFP growth in SSA region.

In a nutshell the literature on financial liberalization has extensively studied the impact of different forms of liberalization on growth and on such macroeconomic variables like investment, trade and costs of capital (Ahmed, 2013; Berkaert, Harvey & Lunblad, 2001; Fowowe, 2008; Henry, 2000 and Kagochi *et al*., 2013). However, research on the impact of both liberalized interest rate and stock market on the development of stock market is sparse. Moreover studies on the influence of foreign direct investment on TFP (De Mello, 1999; Herzer, 2012; and Hong & Sun, 2011) exist but are concentrated outside the SSA region. These issues establish the research contribution of the present study.

1.4 Research Questions

Consequent on the major issues discuss previously, the study wants to answer such questions as:

i. Does the liberalization of interest rate influence the stock market development in the long run for the selected SSA countries?

ii. What role does the quality of institution play in the development of stock market in the seven selected SSA nations?

iii. Is there any effect of stock market liberalization on the development of the stock market in the long run for the selected SSA economies?

iv. Does the liberalization of interest rate lead to increase in foreign direct investment inflows in the long run for the selected SSA countries?

v. In what way has the Foreign Direct Investment inflow affected productivity change as measured in Total Factor Productivity?

1.5 Research Objectives

The general objective of the research boarders on investigating the impact of financial liberalization on development, as measured in FDI inflows and productivity, in selected SSA countries. The specific objectives are:

i. to analyse the effect of interest rates deregulation on stock market development in the long run for the selected SSA countries.

ii. to examine the role that institutional quality play in the development of stock market in the long run for the seven selected SSA nations.

iii. to analyse the impact of stock market development on the development of stock market in the long run for the selected SSA countries.

iv. to investigate the effect of liberalized interest rates on Foreign Direct Investment inflows in the long run for the seven selected SSA economies.

v. to investigate the influence of FDI on productivity change as measured in Total Factor Productivity in the long run for the selected SSA nations.

1.6 Hypotheses

Based on the research framework, the working hypotheses for the study are:

Hypotheses 1

Ho: Interest rate liberalization has no effect on stock market development in the selected SSA countries.

Hypotheses 2

Ho: Institutional Quality has no impact on stock market development in the selected SSA economies

Hypotheses 3

Ho: Liberalization of stock market has no impact on stock market development in the selected SSA nations.

Hypotheses 4

Ho: Interest rate liberalization has no influence on Foreign Direct Investment inflows in selected SSA economies.

Hypotheses 5

Ho: Foreign Direct Investment has no effect on Total Factor Productivity in the selected SSA nations.

1.7 Significance of Study

Over a decade after the liberalization of interest rates and stock markets in the SSA region, the effects of interest rate liberalization on development of stock market are yet to be felt. Financial liberalization through the transmission mechanism of FDI to increase in TFP leads to growth. From the foregoing discussion, four major issues emanate from the study that constitutes the research contributions of this study. The first is the effect of interest rate liberalization on the development of the stock market. Secondly is the effect of liberalizing the stock market on the development of

the stock market itself. Another issue is the effect of quality institution on the development of stock market. And finally the issue of investigating the influence of FDI on productivity for the selected SSA countries has rarely been investigated to the best of our knowledge.

The desirability of financial deregulation on productivity would be verified through the investigation of the influence of FDI on productivity change as measured in TFP. The relevance of the study for policy analysis stems from the fact that negativity in the SSA countries TFP growth (Baier *et al.*, 2004; Collins & Bosworth, 1996; Miller & Upadhyay, 2002) can be eliminated or reduced via appropriate policy design to improve productivity. Such negativity in productivity can be transformed with appropriate policy design and implementation to foster greater productivity through FDI inflows. Furthermore, the significance of the study to literature on interest rate liberalization and the stock market development is brought to the limelight here due to the dearth of researches in this area in the past.

1.8 Scope of Research

The study will cover the period 1990 to 2013 to be able to see the effects of liberalization on the selected SSA countries. Although few of the countries under investigation such as South Africa and Kenya had embarked on liberalization before the period of analysis, the period 1990 to 2013 is general period that most of the SSA countries involved in liberalization. The countries are: Nigeria, Cote d'Ivoire, Botswana, Ghana, Kenya, Mauritius and South Africa. The justification for these choices is dictated by availability of data. The data will be sourced from World Development Indicators and International Monetary Fund financial statistics. For the

purpose of this research, the variables of interest are: interest rate liberalization, real GDP, GDP per capita, credit to the private sector, stock market liberalization, FDI inflows, TFP, market capitalization scaled by GDP, stock turnover ratio and institutional quality among others.

1.9 Summary of Chapter

The chapter starts with introduction of the topic. This is followed by the background which discusses the overview of both interest rate liberalization and stock market liberalization. Individual countries 'efforts at liberalization followed the discussion. The next section elaborates on stock market development and stock market liberalization. The discussion on FDI inflows follows and the analysis on TFP and interest rate liberalization follow the discussion of stock market development. This is followed by the problem statement. Research question and objectives follows the problem statement. The chapter ends with significance of research and scope in that order of sequence.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews past studies on the research topic under study. The First Section dwells on the underpinning theories surrounding the liberalization of interest rates and the concept of stock market development. The theory of FDI and the concept of TFP are also discussed. The Second Section analyzes the different studies in the literature on liberalization of stock market and the impact on foreign investment inflow. The final Section discusses the transmission mechanism between the dependent variables and the proposed explanatory variables.

2.2 Theoretical Review

The research is anchored on four theories viz: Financial liberalization theory, concept of stock market development, Foreign Direct Investment theory and concept of Total Factor Productivity. The financial liberalization theory is spearheaded by both McKinnon (1973) and Shaw (1973) henceforth M-S. Concept of stock market development is discussed based on the indices of evaluating the development of stock market. Foreign Direct Investment (FDI) theory is analyzed via the Organizational Location and Internationalization (OLI) advantages of the foreign Multinational Corporations of Dunning and Rugman (1985). The final review is on productivity theory which is based on both technological progress (innovation) and technical efficiency (catching-up).

2.2.1 Financial Liberalization Theory

Financial liberalization is a situation whereby restrictions on the financial sectors of an economy are either partially or wholly lifted in order to enhance efficient means of allocating financial resources in the economy. Cobham (2002) defines financial liberalization as the removal of barriers to freedom of transactions in the financial markets, regarding the ability of financial institutions to determine their interest rates and choose their own lending policies. Domestic financial liberalization is not the same as capital account liberalization. Domestic financial liberalization is a situation where there are little or no restrictions on lending and borrowing interest rates and absence of control on credits. It is characterized by absence of subsidies and selective credit control. Deposits in foreign currencies by the citizens are allowed (Aretis & Caner, 2004).

Capital account liberalization is the removal of restrictions on local residents' international financial transactions and on investment in financial transactions in the home country by foreigners. This is done by reducing restrictions on domestic banks foreign borrowings, foreign capital coming into the economy, the sectors of industry in which foreigners can invest and the ability of foreigners to repatriate funds earned from investment in the domestic economy (Cobham, 2002). M-S emphasize that financial sectors of the developing economies are repressed when governments rather than the markets decide the prices, supply and the recipients of credits. The repression according to M-S, leads to sub-optimal outcomes for economic development since the market is more able to efficiently allocate resources better than the government. Furthermore, financial liberalization theory which is an

offshoot of neoclassical growth theory portends that countries should liberalize their financial sectors in order to make the interest rates to be market determined.

Liberalization would attract capital from capital abundance (advanced) countries to capital scarce (developing) countries. Capital, the theory stresses, would normally move to the developing countries (due to attraction of high interest rates). Financial liberalization can influence savings, investment and growth through efficient financial development. The channel through which financial development influence capital inflow and growth according to M-S is via savings-investment. The two writers stressed the importance of the quantity or volume rather than the quality or efficiency of investment. They however use different means of achieving this high volume of investment that lead to growth. McKinnon's approach is directed towards the complementarities hypotheses. It is based on the belief that money balances and capital accumulation are complementary.

The hypothesis states that money is held for two reasons: real balances and physical capital. Money and capital are thus viewed as complementary assets. $(M/P)^D$ is the demand for real balance and I/Y is the investment ratio. Return on capital is $R_{CAPITAL}$ while return on money is $R_{MONEY.}$ The model implies that both demand for real balances and investment ratio react positively to average return on capital. Thus a high level of deposits through liberalization means that more money would be directed towards investment to promote growth. Shaw (1973) focuses on debt accumulation which is based on inside money acting as loan to the private sector. He holds the view that high level of money stock in relation to economic activity leads

to high level of financial intermediation and growth. In essence high interest rate is necessary to attract savings (Ang, 2008).

M-S suggest that developing countries need to liberalize the financial sectors of their economies in order to allow the inflow of foreign capital into these economies. Shortage of domestic capital to carry out investment projects, the M-S argue is one of the banes of developing economies. Theory states that development of the stock market leads to more capital which also increase investment activities in the economy. There are divergent of views however concerning the empirical evidences of the positive effect of financial liberalization on growth in the SSA countries. Some researches like Adusei (2013) and Ahmed (2013) show evidences of negative effects of liberalization on growth. Others Fowowe, (2008) and Kagochi *et al.* (2013) portend and agree with M-S that there are positive benefits of financial development in inducing capital inflow.

2.2.2 The Concept of Stock Market Development

Stock market development is influenced by different factors ranging from supply and demand for shares to institutional factors and economic policies. The development of the stock market is much more encompassing than the growth or the performance of the stock market. The growth of the stock market is different from stock market development. The development of the stock market indicates that the growth of the stock market is transferred to the growth of the real sector (El-Wassal 2013). In a situation where the stock market is growing without influence on the real sector of the economy, such as the industrial and the agricultural sector, then the stock market

is not developing. It is in line with this that Mankiw (2011) opines that when there is a problem in the stock market sector in an economy, and then it shows that economic depression is around the corner.

Moreover, Bencivenga *et al.* (1996) while drawing on the work of Hicks (1969) on important of capital market liquidity on technological innovation, elaborates on how efficient equity markets promotes better quality and costs of investments. According to the paper reduction in transaction costs increases the productivity of investment. It makes investment in equity market to be more attractive. In a situation where the existing shareholder do not prevent the innovation of new capital investment then the reduction of equity costs would eventually lead to increase productivity and growth. Furthermore, the development of stock market is based on the demand and supply for stocks which is influenced by the expected economic gain on the stocks. The issuers of stocks (supply) are interested in the reduced cost of issuance. Investors which represent the demand for stocks are more particular about getting the best return associated with the risk on such investments.

The concept of stock market development entails the supply and the demand for stock which is the building blocks of the concept of stock market development, and the institutional qualities coupled with economic policies which constitute the lubricating factors. The demand for shares is determined by economic growth which determines the per capita income level. In essence while demand and supply for stocks represents the foundation, institutional qualities and economic policies represent the lubricating factors for the effectiveness of stock market development

(El-Wassal 2013). According to Yartey and Adjasi (2007), high economic growth must be translated to growth in income per head to be able to influence the participation in stock market activities. The growth in the income level must be translated to the growth in income per head. It is only a situation where individual income level is increased that the opportunity to invest in stock market arises.

In addition to this, the demand for shares is affected by the investors' base or the institutional investors. The investors' base should be diversified through such institutional investors as the pension funds insurance companies, mutual funds and others dealing in different risks and focusing on different sectors in the economy. Institutional investors are the ones controlling activities in the stock markets. Outside the demand and supply factors which are the foundation for stock market development, institutional factors and good economic policies are the lubricating factors that affect the effectiveness of stock market development. Good economic policy is the enabling economic environment that is conducive for the effective operation of the stock markets. This is determined by the monetary policy fiscal and tax policy and foreign participation policy of the government. The institutional factors are the legal codes that affect market intermediation, supervision and enforcement tools and issuance of securities. A sufficient and strong institution is supposed to have positive effects on stock market development (El-Wassal, 2013).

The three major features of regulation of securities are the legal framework, supervisory of the legal framework and enforcement of the regulatory framework. Supervision and enforcement are the means of ensuring that the rules are abided by

while the legal frameworks are the actual rules. Another view in the literature (Demirguc-Kunt & Levine, 1998) see stock market development as being determined by market size; liquidity; volatility; market concentration; institutional factors and integration of the domestic stock market with the world market. Stock market capitalization measures the size of the market while the values of shares traded and turnover ratio measures market liquidity. The more liquid and the larger the size of the stock market, the more developed is such market. Market concentration is determined by percentage of shares controlled by the first ten or the first five companies in the economy. The lower the market concentration, the better developed is the stock market. While market volatility may be desirable, excessive volatility is not healthy for a well-developed stock market.

2.2.3 Theory of Foreign Direct Investment Inflow

International capital flow stems from two different theories: the Foreign Direct Investment theory, and the concept of international portfolio flow. Direct foreign investment emanates from the theory of Foreign Direct Investment (FDI). The theory of Direct Foreign Investment (FDI) as championed by Hymer (1971) is a deviation from the neoclassical capital arbitrage theory of portfolio flows. The arbitrage theory of portfolio flows explains that international capital flows is determined through its reaction to different interest rates among economies. However arbitrage theory of portfolio flows fails to explain the reasons behind the investor's motivation of the control of their assets (McClintock, 1988). It is on this basis that FDI theory is introduced.

The new FDI theory according to Hymer (1971) is based on industrial organization approach. In this approach, FDI is seen as a means by which oligopolistic Multinational Enterprises (MNEs) try to close out market competition by establishing barriers to entry through such means as superior knowledge and product differentiation. Foreign investment or MNEs exist in order to take advantage of imperfect market for rent seeking and other monopolistic exploitations. He thus recommends that policy should be put in place to regulate the activities of the MNEs. Dunning (1981) popularizes the theory of internationalization using the three bases for trade: ownership, location and internationalization OLI. Foreign firms are interested in locating plants in foreign firms because they have ownership hedge over domestic firms. This put the foreign investors in a vantage position as against the existing domestic investors These MNCs therefore demand that the recipient countries provide the enabling environment like the entrenchment of property rights in order to guide against future appropriation of the foreign investors' funds.

Another factor is the location advantage which is based on the fact that MNCs find it cheaper to site plants and machinery to produce in a foreign country than to export such goods or services. This is owing to the fact that tariffs and other export taxes may be higher coupled with the fact that the costs of transporting such commodities may be higher than actual production in the foreign countries. The third reason for foreign investment is internationalization. It is where firm prefers to control or set up a direct plant in a foreign country rather than license another firm to produce the same product. Internationalization makes it possible for foreign firms to be protected from the risks of oligopolistic foreign buyers or supply that may disrupt the markets.

The benefits of internationalization make it possible for MNCs to exert control of cross-national production against such disruption (Li & Resnick, 2003).

Dunning and Rugman (1985) posit that firms which are better in management of industries are justified for internalization of economic activities. This school of thought explains that, firms through internalization of economic activities in reducing transaction costs may provide better and efficient results than the market. Two different types of market imperfections that may be internalized are identified. The first is the structuralist market imperfection for rent-seeking motive. It is the transfer pricing for tax evasion. The second is the reduction of transaction cost imposed by the market. The transaction costs school of thoughts opines that since the market cannot adequately provide technology, the MNEs must internalize these intangible assets by the creation of property rights in order to generate enough private return (McClintock, 1988). In support of this Teece (1985) criticizes Hymer for focusing only on market as the basis for investment. He argues that the transaction costs emerge as a result of imperfection of the market and the ability of the MNEs to efficiently manage the market failure justifies the internalization of the market by the MNEs.

The host government has the responsibility to provide the enabling environment necessary for foreign investment to flourish. The enabling environments are provision of roads, electricity and establishment of property rights to protect the interests of the foreign investors. In order for the MNEs to provide the high technology, plant and machinery in the domestic economy, the host government must

establish contractual agreement between the foreign investors and the host government. All these would go a long way to encourage the establishment of FDI in the domestic economies. Furthermore, international portfolio flow while opening up varieties of choices for investors also bring with it two major challenges. The first is exchange rate risk while the other one is the barriers to international flow of capital (Eun & Jakiramanan, 1986). Investors in foreign countries are mainly interested in the values of the foreign economy's exchange rate prior to investing. If the risk of exchange rate is high in form of low value of the local currency of the domestic country, this would deter investors from investing in such country.

In addition to this, the risk of expropriation and the repatriation of dividends and interest are issues of interest to foreign investors. In his model of international asset trading, Obstefeld (1994) links the channel of transmission between long-run growth and financial liberalization through the efforts of financial intermediaries. International portfolio provides avenue for risk diversification by shifting resources from low yield less risky investment project to high return and riskier investment project. It is these higher risk investment projects that contribute more to growth. Still on the importance of international capital inflow, Stulz (1999a) stresses that capital flow which results from financial liberalization reduces costs of capital. The reduction in costs of capital gives greater opportunity for more investment financing. And firms are subjected to the discipline of investing in capital market. Foreign investment is purported to be the most stable of all the components of capital inflows since it entails the establishment of industries rather than short term investment of funds in the host countries.

It is a long term capital inflow (Shen, Lee & Lee, 2010). However, Claessens, Dooley & Warner (1995) find that the long term inflows are as volatile as the short term. The distinction between long and short terms is merely theoretical. The knowledge of the type of flow does not in any way affect the ability of the flow to predict aggregate capital account. The paper argues that foreign investor can use his long term assets to borrow and thus use this to export capital thereby causing capital flight. In support of this view, Singh (2003) purports that the advent of hedge funds and derivatives has reduce the delineation between FDI and portfolio capital inflows. On the argument that foreign investment enables transfer of technology and skilled managerial manpower to the local firms, it was counter argued that FDI can also be a source of stiff competition to the local firms and may send them out of the market. Also foreign investment leads to future foreign exchange liabilities. If this is not checked it may lead to persistence foreign capital outflows (in form of repatriation of earnings and dividends payments).

2.2.4 The Concept of Total Factor Productivity

The traditional theory of growth accounting fails to explain the large source of growth of capital from production process. The elasticity of output with respect to capital is too large to account for the contribution of capital to the growth process (Hulten, 2001). Using total differentiation Solow (1957) divides growth rate of output into growth rate of factor input scaled by their respective contribution to productivity and the efficiency parameter. After each of the contribution of labour and capital are paid their incomes, then the production function will be the marginal product of each of the factor plus the efficiency parameter. Using the production function curve, the growth rate of factor input shows the movement along the curve

while the efficiency parameter represents a shift of the entire curve. Theoretically the Solow residual is equivalent to the efficiency parameter (Hulten, 2001).

However, critics of Solow opine that the theory is based on constant return to scale. When there is constant return to scale, after the factor inputs are paid each of their rewards which are their marginal productivities, then the entire production function equals the values of the marginal productivities of factors and the residual disappears. Analysts have introduced two main methods of measuring TFP growth which are frontier and non-frontier methods. The difference between frontier and non-frontier methods stems from the explanation of frontier which is a boundary that marks the highest attainable position. The attainable position can be minimum or maximum depending on whether it is a cost or production respectively. Cost frontier is the minimum cost that can be reached subject to the prices of inputs. Production frontier is the maximum output that can be achieved given the available resources or inputs. In addition to this, the frontier method allows for technical efficiency. A firm can attain the frontier either through innovation or efficient means of production process. Technical progress results from outward shift of the production function while movement towards the boundary is technical efficiency.

The non-frontier method does not give room for efficiency or inefficiency and measures TFP only in form of technical progress. It is mainly used in macro-analysis of TFP growth (Kathuria, Raj & Sen, 2012). The two approaches (frontier and non-frontier approach) can be estimated through the parametric and non-parametric techniques. Frontier method assumes the existence of attainable production frontier

boundary given the available resources. This approach divides the sources of productivity growth into technical change and technical efficiency. Technical change or progress is in form of innovation which is the attainment of the best practice production boundary. Technical efficiency is the efficient means of utilization of inputs such as managerial expertise, learning by doing. The nature of the economies of developing countries is such that they are in better position to attain growth in TFP through efficiency in the means of production than through innovation (Nishimzu & Page, 1982). TFP growth for the frontier method is calculated using the Malmquist Index. The approach uses a distance functions which are proxies for multiple-output and multiple-input technology. Data are required on quantities of input and output (Fare *et al*., 1994).

Given assumptions on different time and production technology using distance function, Fare *et al.* (1994) divides the components of TFP growth into technical progress and technical efficiency using linear programming. The combination of both technical progress and technical efficiency make up the productivity change which is the Malmquist Index. The calculated index must be greater than or equal to one to attain the desirable technical progress or technical efficiency. The index value of less than one indicates inefficiency and each unit of country must strive to catch up or be on the boundary. Assuming total calculated Malmquist index value of 3.2 percent which can be decomposed into contribution of technical progress that is greater than one (1.6) (that is high technical progress) combine with an inefficient technical efficiency of (0.5) which is less than one. This demonstrates that lower technical efficiency can be combined with high technical change (Fare *et al.,* 1994). It implies that the information or knowledge of contribution to TFP via both technical

efficiency and technical progress is vital from the issue of policy analysis and implementation.

The two sources of productivity change (technical progress and technical efficiency) require different policy implementation and should be addressed separately to prevent policy mismatched. The non-frontier method can also be divided into parametric and non-parametric approach. The parametric method is commonly referred to as the production function approach while the non-parametric method is referred to as the growth accounting method. Suffice to mention here that both the non-parametric and parametric start with the production function using the popular Cobb Douglas production function. Romer (1986) introduces knowledge creation as an additional input in the production process. Knowledge according to the author is a function of expenditure on Research and Development (R & D). The creation of knowledge is subject to diminishing returns so as to ensure that the growth of consumption with utility is not too rapid. Another point of critique of the Solow residual is in the area of imperfect competition. The theory rests on the assumption of perfect competition and marginal cost pricing principle. The reality of world pricing is such that the prices of factors tend to be higher than the marginal cost pricing rule thus giving a wrong representation of the residual which tends to be biased based on perfect competition rule (Hulten, 2001).

The literature abounds with different interpretations of TFP. In the view of Harberger (1998) the residual or TFP is synonymous with ‘real cost reduction’ or managerial know-how. Example is the replacement of a lapse manager with a strict one which

eventually leads to increase productivity in such firm and this is real cost reduction strategy. Most managers of corporations focus on this strategy of reducing cost in order to maximize gain. Analysts see increase productivity in terms of technical efficiency in the production process. Nishimizu and Page (1982) view TFP from two perspectives of both technical efficiency and technological innovation. Technical efficiency is the efficient manner in which inputs are transformed into output. According to the article the ability of the developing countries to copy the advanced countries technology is referred to as the technical efficiency. On the other hand innovation which leads to the shift in the frontier of production function is referred to as technological progress. Innovations promote R & D which eventually leads to better and more productivity. R & D refer to as knowledge is a major determinant of TFP. Some authors in the analysis of growth theory likened this knowledge to TFP. Empirical application however shows that there is a clear difference between TFP and knowledge in the sense that not all knowledge is beneficial to growth. Also the existence of factors like institutions and liberalization has put a wedge between knowledge and TFP (Isaksson, 2007).

Ahn (2001) is of the view that input of innovation in form of investment in R & D is not so important for productivity gain as much as the use to which such innovation is put. In response to that Isaksson (2007) points out that for empirical purpose, data on investment expenditures (innovation input) are more readily available than data on the R & D applications. Innovators are the advanced countries that invent the high technology that are being copied by the developing countries. And the ability of the developing countries to copy the advanced countries technology is pertinent on the elimination of such bottlenecks like poor institutions that are prevalent in the

developing countries. It also depends on basic development of human capital through which such knowledge can be transmitted (De Mello, 1999). Scholars have identified the theoretical linkage between FDI and productivity improvement. The point is that it is costlier for foreign investors to operate in foreign countries in comparison to domestic investors who already have advantages of local market and business environment. For this reason one of the way by which FDI can penetrate is through higher productivity which the local investors may not have (Griffith, Redding & Simpson, 2003). Moreover FDI can influence growth in TFP by stimulating innovation or by reducing inefficiency.

Through the spillover effect or the transfer of technology, the adoption of advanced country's technology by the domestic companies is easier. It also increases competition among the local firms and opens up opportunities for external markets for the domestic companies (Griffith *et al.*, 2003). Critics assert however that TFP cannot be interpreted as technical efficiency in as much as there are other determinants like political instability, institutional factors external shock that affect growth but are not accounted for in the measured factor inputs (Bosworth & Collins, 2003). This can be taken to be technical inefficiency and can be adduced for the reason why some countries especially in the SSA region are having negative TFP. It is pertinent to mention here that the study views TFP from the perspective of technological change only. This is due to the fact that the study focus on how FDI affects (positive or negative) TFP and not the source of TFP growth.

2.3 Empirical Literature

The empirical analysis would be discussed based on different studies and the variables analyzed by different authors. Such studies are on interest rate liberalization, stock market liberalization, FDI and TFP.

2.3.1 Studies on Relationship between Financial Liberalization, Financial Development and Growth

De Gregorio and Guidotti (1995) investigate the relationship between financial development and growth in 98 developing countries from 1960 to 1985. The result reveals a positive relationship between financial development and long run growth. This positive effect is however strong both in middle and low income countries than the high income countries. The authors attribute this to the fact that financial development for the advanced countries happen outside the banking industries while the proxy for financial development for the study is the bank credit to the private sector. Anderson and Tarp (2003) investigate the influence of financial liberalization and financial development on growth. They adopt instrumental variables using GMM in a cross-sectional data for developing countries and suggest that the claimed that financial development causes growth is not verifiable. Adusei (2013), using a time-series conducts an investigation of the relationship between financial development and growth in Ghana from 1971 to 2010. The author discovers that financial development has a negative relationship with growth in Ghana.

Ahmed (2010) investigates the linkages among financial liberalization, financial development and growth in 15 SSA countries using panel data over the period 1976 - 2005. The result indicates a long term positive relationship running from financial

development to growth. For the estimation of financial liberalization to growth however, there is a negative relationship between financial liberalization and growth. Ahmed (2013) further examines the role of financial liberalization both on financial deepening and growth in 21 countries in the SSA. The author applies the system GMM estimator of dynamic panel. The result shows that financial liberalization has negative impact on economic growth. However, financial liberalization has a positive impact on financial deepening. Levine, Loayza & Beck (2000) using system GMM dynamic panel estimators examine whether development of financial intermediary has effect on growth. Also the authors investigate whether differences in country's legal rights of creditors, enforcements of contract and accounting standard have influence on countries' level of financial development. The result indicates a positive sign. Developments in the financial intermediary have positive effects on growth. Countries that have efficient contract enforcement, strong accounting standards and good legal rights of creditors tend to have better financial intermediaries development.

Noula (2012) uses a bound testing approach to cointegration technique in order to analyze the effect of financial liberalization on household savings in Cameroon from 1973 to 2010. He discovers a positive significant relationship between financial liberalization and household's savings in Cameroon. Demetriades and Hussein (1996) using a time-series data examine the relationship between financial development and growth in 16 developing countries. While there are unidirectional causality between financial development and growth in some countries, others show bi-directional causality. The implication of this according to the authors is that economic policies are country-specific. The success of economic policies depends on

the effectiveness of the institutions which implements them. Atje and Jovanovic (1993) analyze both level and growth effects of financial development on economic growth. There are greater effects of both level and growth effects of stock market development on growth. The result on bank aspects of financial development is not significant. The paper recommends that policy makers should shore up growth in their respective countries by improving the performances of their stock markets.

In a panel study analysis of 19 SSA countries, Fowowe (2008) finds that liberalization has positive impact on growth. Using two indices and a dummy variable to capture the effects of financial liberalization in the respective countries, the results show a significant positive relationship between growth and financial liberalization. The author thus recommends that liberalization should be encouraged as a long-term policy in the respective countries. Fowowe (2013) in his analysis of financial and macroeconomic data concludes that different countries have had varied experiences with financial liberalization. The author suggests that the expected gains from liberalization have not been observed in most countries implying that liberalization have not achieved the intended results in the SSA countries. Kagochi *et al*. (2013) examine the relationship between financial development and economic growth in seven SSA countries for the period 1991-2007. The results show that stock market measures of financial development have positive significant relationship with growth. However banking assets which is proxy for banking unit of financial development has a negative relationship with growth.

The conclusion from causality test shows that in most of the countries under investigation, the developments in the real sectors influence developments in the

financial sectors. Hermes and Lensink (2005) investigate the effects of financial liberalization on savings, investment and growth in 25 developing countries spanning 1973 to1996. The findings show that there is no evidence of financial liberalization positively influencing savings. However there are weak signs to show that financial liberalization reduced savings. Financial liberalization has positive effect on private investment and per capita growth. King and Levine (1993b) in explaining the relationship between financial sector and growth summarized that growth responds to financial sector distortion by lowering growth. Financial sector also responds to distortions in the public sector, distortions such as corporate taxes inefficient enforcement of property rights would affect financial development. In the end there is a simultaneous influence between growth and financial sector.

The overall result shows that financial development has a positive effect on growth. There are however, variations across countries and over time which depends on the level of domestic financial markets. Emphasizing the significant of endogenous growth model, Fry (1997) suggests that model of endogenous growth magnifies and prolongs the impacts of financial condition. The paper stresses that while financial development improves growth, discriminatory taxes of commercial banks, investment banks, stock markets and mutual funds through high reserves requirements, interest and credit ceilings and inflation reduce the growth rates by inhibiting financial development. Stiglitz (2002) in his argument against liberalization opined that capital market liberalization brings greater economic volatility to the developing countries when they liberalize and a low ability to manage such volatility. Lending credence to this Cobham (2002) posits that volatility of capital account is more pronounced on the volatility of the domestic macro-

economy, on government budget, private sector investment. The foregoing studies analyzed the impact of financial development and financial liberalization on growth in different entities such as country, region or selected countries.

The relevance of these literatures to the present study is in the inclusion of financial liberalization and financial development among the variables that were estimated. The proxies used to represent both financial development and financial liberalization is subject of criticism in the literature. The binary method of measuring financial liberalization entails zero for no liberalization and one if the country is liberalizing. It does not take into cognizance the intensity of liberalization method (Van der Laan, Cunha & Alves, 2011). The issue of measurement of financial development is also criticized by the structuralists on the basis that the curb markets have greater influence on financing activities in the developing countries (Ang, 2008). The informal sectors play no small role in the financing activities of the financial sectors in the developing countries, and measuring the activities of these curb market may be difficult. The informal sectors are not under the control of the monetary authorities. As such any action that is geared towards controlling the activities of the entire financial sectors may be jeopardized since a sizeable number of the financial sectors are not within their control. This implies that the activities of the informal sectors, if not properly monitored, may weaken the ability of the monetary authorities to properly control the financial sectors.

2.3.2 Studies on Relationship between Financial Liberalization and Institutional Qualities

There are different studies that use institutional quality as explanatory variables to analyze the effectiveness of liberalization on growth. Arteta *et al.* (2001) opine that removing restrictions on capital can be efficiency and welfare enhancing only when the main imperfections in the contracting and information environment are non-existent. Lending credence to this point, Klein (2005) in his analysis of 71 countries finds the effect of capital account liberalization to be statistically significant for about a quarter of the countries in the sample. The author shows that the maximum amount of liberalization effect on growth is found at the medium (not the highest) level of institutional quality. Also supporting the important of quality of institutions Henry (2006) suggests that weak institutions and inappropriate government supervisory agencies can distort economic decision making, reduce total factor productivity and lower rate of return than would have otherwise occurred.

Stulz (2005) stresses that contrary to the views of the neoclassical, net equity flows to the developing countries is negative. This is compounded by the agency problem that arises out of imperfection in the functioning of the markets in these countries. Singh (1997) is of the opinion that in the advanced countries with all the established institutions, market does not function efficiently due to some serious information and disclosure deficiencies for some of the stocks which make the investment in them to be low. If there are information and disclosure problems in the advanced countries, the situation in the developing countries with perverse problems of inefficient enforcement of contracts, supervisory and regulatory lapses political instabilities can be better imagined. Chinn and Ito (2006) examine the relationship between

liberalization and financial development using both credit and equity markets as proxy for financial development. The study employs panel data for the period 1970-1997 for 105 countries.

Finding indicates strong relationship between financial openness and financial development and this relationship is strengthened by the existence of investors' protection and accounting standard. In essence, liberalization is more effective with the provision of property rights and proper accounting standard. According to Obstfeld (2009) institutional reforms like the rule of law, corruption, and contract enforcement are the ingredients needed to make external financial liberalization effective. Domestic financial market imperfections and institutional weakness are the main problems not financial openness. Furthermore in a regression of 78 countries for the period of 1970 to 2000, Calderon and Fuentes (2006) find that policy complementarity is an important explanation for different responses of growth to financial openness and international trade. The regression result shows that financial liberalization has a negative effect on growth for countries with weak institutions.

The result further reveals that both trade and financial openness have non-linear effect on growth. Kose *et al*. (2009) also recommend that developing countries can derive some benefits that boost long-run growth and welfare from globalization based on maintenance of stable macroeconomic policies. It must be supported with sufficiently strong, financial and other institutions, regulations and governance. Ascribing the causes of differences in growth among countries to institutions and geography, Acemoglu (2003) posits that nation with good institutions promote investment friendly environment. This is done by implementation of property rights

among the citizens which restrains the tendency of the powerful and politicians from expropriating the incomes of the others in the country. Nations with good institutions are such countries with high quality human capital that are necessary to promote technology which will enhance growth. The geography hypotheses focus on the issue of climate condition.

Abu *et al.* (2015) examine the effect of institution through the link among political instability, economic development and corruption in the ECOWAS region for the period 1996-2012. The paper uses Granger causality to determine the direction of causation among political instability, economic development and corruption among the ECOWAS region. Forecast Error Variance Decomposition (FEVD) is also used to analyze the variations and reactions among the variables beyond the sample period. Results of the causality test suggest the presence of short run causality running from political instability to economic development. Long run causality also runs from political instability and economic development to corruption. The conclusion is that poor institution in form of political instability leads to high level of corruption which is also bad institution.

2.3.3 Studies on Financial Liberalization, Financial Development and Interest Rates

Research on the link between interest rate liberalization and stock market development is sparse. Some studies examine the relationship between financial development and growth using liberalized interest rates as proxy for measuring financial liberalization (Odhiambo, 2009 & 2010). Odhiambo (2009) investigates the effect of interest rate reform on financial deepening and growth in Kenya using time-

series data from 1968 to 2004. Two models are estimated, financial deepening model and growth model. Adopting the technique of cointegration and error correction methods, the paper finds that interest rate reform has positive impact on financial deepening in Kenya. The paper concludes that interest rate liberalization has positive influence on growth in Kenya. Reinhart and Tokatlidis (2002) survey the effect of liberalization on savings, consumption financial development in the developing countries. The conclusion from the authors is that the other developing countries like the emerging economies perform better in form of savings than the SSA region. In SSA region, liberalization has not been able to increase savings owing to the poverty level of the SSA countries.

Odhiambo (2010) using time-series data from 1970 to 2006 analyzed the impact of liberalized interest rates on bank development and economic growth in South Africa. In one of the two models estimated financial deepening is the dependent variable while deposit interest rate, inflation economic growth are explanatory variables. The paper finds that the liberalized interest rate as measured by the deposit rate has significant effect on financial deepening. Galbis (1993) observes 28 countries that adopted interest liberalization and finds that they all have high incidence of real interest rates. The author concludes that the high interest rate can be the result of either positive or negative factor. Positive factor can result from high demand for investible funds resulting from increase in investment. Negative factor may be the consequence of macroeconomic or structural maladjustment from economic reform such as high inflation. The author concludes that high interest rate have both wide causes as well as diverse effects. The knowledge of both causes and effects are crucial for the management of the ills of high interest rates.

There are studies that also examine the dynamism of interest rate from different perspectives. Sundararajan (1987) examines the impact of interest rates on the productivity of capital on South Korean firms. Result shows that real interest rate raise the relative price of capital and thus encouraged a more intensive use of capital and substitution of more capital for labor. Omole and Falokun (1999) analyze the linkage among interest rates and debt-equity ratio, profitability and turnover of firms in Nigeria. The result reveals that there is a relationship between interest rate and financing pattern of firms with firms' profitability. The result also indicates a relationship between interest rate liberalization and the growth of equity markets. The similarity between the present study and Omole and Falokun's study has to do with the fact that the present study is investigating the impact of liberalized interest rates on stock market development. It is the first objective of the present study.

Demetriades and Devereux (1992) examine the relationship between interest rate liberalization and investment by employing panel data for 63 developing countries for the period 1961-1990. Finding indicates that there is negative effect of liberalizing interest rate on investment. Odhiambo (2010) analyzes the relationship between interest rate reform and economic growth in Tanzania using time-series data from 1969 to 2006. Two tests were conducted in the analysis. The first test shows the effect of interest rate reform on financial development, the result of which is positive and significant. The second test estimates the effect of financial development on growth, the result of this is not significant indicating that financial development did not cause growth in Tanzania. Furthermore, in a panel study of seven SSA countries, Balogun, Dahalan & Hassan (2016b) examine the long run influence of interest rate liberalization, quality institutions on the development of stock market. The paper

employs panel dataset for the period 1990 to 2013 with the technique of Pooled Mean Group. Result reveals that there is a negative long run relationship between liberalization of interest rate and the stock market development in the selected SSA countries.

Supporting the claim of negative effect of interest rate liberalization Arestis and Demetriades (1997) purports that high real interest rate does not boost savings or the real sector. It rather makes the liberalized country more prone to vagaries in the international capital market. In a contrary response to the M-S view of effect of interest liberalization on growth analysts suggest there is no clear cut transmission mechanism from interest rate to growth. As such the hypotheses relating financial liberalization through interest rate to growth might not be true. Corroborating this view Calvo and Coricelli (1992) suggest that in the case of Eastern European economies, real interest rate may be the manifestation of unstable financial structure rather than financial development. Real interest rates according to the authors signifies weak regulatory structures, lack of entrenchment of property rights all of which increase the premia on risk that are embedded in the rate of interest. Hence high rate of interest may be a reflection of weak institution rather than better financial mediation.

Lending credence to this point Calvo and Gudotti (1991) are of the views that very high real interest rate does not measure efficiency of investment but a lack of credibility of economic policy.Various forms of country risk may lead to lower level of investment. Thus real interest rate is not closely associated with growth showing

no clear-cut relationship between interest rate, savings and investment. The conclusion from them is that real interest rate may be a poor indicator of financial intermediation while it may be a good indication of measuring efficiency of investment. A cursory look at all the reviewed articles indicates that none of them dwells on interest rate liberalization and stock market development which establishes the rarity of the present study.

2.3.4 Studies on Stock Market Development and Stock Market Liberalization

Different authors examine the relationship between stock market and growth. Arestis, Demetriades & Luintel (2001) analyse the relationship between economic growth and stock market development using time-series method. From the result it is discovered that banking sector contributes more to growth in Germany, Japan and France than the stock market did contribute to growth in these countries. Adjasi and Biekpe (2006) investigate the relationship between stock market development and growth in fourteen African countries in panel data estimation. The authors find a positive relationship between stock market and growth. Levine and Zervos (1998) in analysing data for 47 countries suggest that the two indices of financial development (both stock market liquidity and banking sector development) are positively correlated with existing and future rates of growth.

Yartey and Adjasi (2007) in an unbalanced panel data of fourteen African countries, examine whether stock markets have effect on economies of these SSA countries. The value of shares traded which is the measure of liquidity of the stock market is the only significant variable among others variables. Using a time-series data from

1970 to 2007 in determining the relationship between capital market and growth in Nigeria, Okpara (2010) finds that capital market indicators like market capitalization, value of shares traded all have significant impact on GDP growth. Additionally, the result shows that market capitalization and value of shares all affect GDP in a unidirectional way from financial development to growth. Moreover, Obiakor and Okwu (2011) examine the effect of development of capital market on Nigeria's economic growth from 1981 to 2008 using time-series data. The indices of stock market used are market capitalization, values of shares traded. Other independent variables are gross capital formation and foreign private investment.

Result shows that out of the indices of stock market, value of shares traded is the only variable that has significant positive relationship with growth. Market capitalization although significant but has negative relationship with growth. Yartey (2010) investigates the impact of macroeconomic and institutional determinants of stock market development using panel data for 42 emerging economies. The result shows that domestic investment, income level, well developed banking sector and stock market liquidity are all ingredients of stock market development. At the initial stages of stock market establishment, banks evolve to complement and aid in the promotion of stock market. At a later stage of development of stock market both banks and stock markets development compete between themselves. Furthermore, Solarin and Dahalan (2014) using GMM approach in a study of selected African countries find that turnover ratio which measures stock market liquidity is positively related to growth. In the same study, index of banking development is found to be negatively related to growth.

Authors like (Berkaert, Harvey & Lundblad, 2001; Gupta & Yuan, 2009 and Henry, 2000) investigate the effect of stock market liberalization on growth, investment and stock prices. In the sample of 11 emerging markets economies examined by Henry (2000), the average growth rate of real private investment in the three years immediately after stock market liberalization exceeds the sample average by 22 percent. The paper reveals that the developing countries in the sample exhibit high growth rates of private investment after liberalization of their stock markets. Kaminsky and Schmukler (2003) in their analysis of 28 developed and emerging countries investigate the effects of financial liberalization both in the short and long-run considering financial circles. The paper finds that stock market boom and busts have not been deep in the long-run following financial liberalization. However, evidence from emerging economies with larger boom and busts in the immediate aftermath of financial liberalization is a reflection of large financial circles following liberalization.

Bekaert *et al*. (2001) use time series and cross section data for 30 emerging economies from 1980 to 1997. The paper explores relationship between equity market liberalization and real growth rate. The paper uses techniques of GMM and growth rate of real GDP to proxy for real GDP growth. Three different indices are used to proxy for stock market development and different liberalization dates were adopted. Results suggest positive influence of liberalization on growth. The majority of the countries investigated show larger average economic growth after financial liberalization. Using time-series data, Nowbutsing and Odit (2009) examine the relationship between stock market development and the real sector in Mauritius between 1989 and 2006. Finding shows that the two stock market indices of market

capitalization and value of shares traded have significant positive relationship with growth. El-Wassal (2013) analyzes the theoretical framework of stock market development. The author portends that the development of stock market is a multidimensional concept that cannot be measured by using one index. He thus recommends that stock market development can be measured using the weighted average of stock market size; liquidity; market concentration; volatility and its link with the economic activities.

Gupta and Yuan (2009) evaluate the effect of a stock market liberalization using an industry level data. The result reveals that increase in industry value added growth, investment and average market capitalization all occurred after liberalizing the stock markets. This according to the paper is consistent with the view that financing constraints are minimized when stock market is liberalized. Grossman and Shiller (1981) examine whether the variability in consumption lead to variability in stock prices in US using historical data on consumption from 1890 to 1979. The result of the estimation reveals that changes in stock prices are affected by current consumption which is determined by real interest rates and economic activities. Yartey (2008) investigates the determinants of stock market development in 42 emerging market economies from 1990 to 2004. In his empirical analysis and using the same means of measuring stock market development as Calderon-Rossell (1990), Yartey (2008), uses the market capitalization as a percentage of GDP to represent the stock market development. Finding shows that political risk, stock market liquidity and capital inflows are all important determinants of stock markets. However both liberalization of interest rate and the stock market have been criticized on the grounds of causing disruption to the nascent economies and the degree of the

disruption depends on how fast the policy makers are able to respond to crisis. The fact that emanates from this is that liberalization of both interest rates or stock markets are not without costs.

The foregoing discussion are attempts at investigating the impacts of stock markets liberalization, financial liberalization on growths with the mitigating or strengthening influence of quality of institutions. Most of the studies try to look at the links between financial liberalization and growths and the direct and indirect effects of institutional qualities at reducing or increasing the impacts of financial liberalization on growths. To the best of our knowledge no effort has been made to investigate the impact of liberalized interest rates on stock markets development in the SSA region.

2.3.5 Studies on Foreign Direct Investment

Asiedu (2006) in a panel dataset that spans 1984-2000 examines the relationship between FDI and growth in 22 SSA countries. Finding indicates that natural resources, low level of inflation, strong infrastructure and enabling environment all contribute to positive impact on FDI. Bengoa and Sanchez-Robles (2002) in a panel data analysis that run from 1970-1999 for a sample of 18 Latin American countries examine the relationship between FDI, economic freedom and growth. Result indicates positive relationship between economic freedom in the recipient country and growth. Furthermore, Hermes and Lensink (2003) using data for 67 developing countries for the period 1970-1995 investigate the effect of financial development and growth. Result shows that for the Latin America countries there is a positive relationship between FDI and growth. However the results on the SSA countries indicate a negative influence between foreign investment and growth.

Alfaro *et al*. (2004) in analyzing data for 39 countries for a panel dataset that spans 1981-1997 examine the relationship between FDI and growth. The paper investigates the role play by financial market in the link between FDI and growth. It concludes that strong financial markets exert positive relationship between foreign investment and growth. Carkovic and Levine (2002) however using Generalized Method of Moment (GMM) technique with a data for 1960-1995 finds that there is no relationship between FDI and growth. Brafu-Insaidoo and Biekpe (2013) analyze the relationship between both domestic financial liberalization and equity market liberalization on capital inflow in the thirteen frontier SSA markets from 1975 to 2009 using panel data. Finding reveals that both domestic financial liberalization and equity market liberalization have positive significant effect on foreign direct investment and foreign portfolio inflow collectively as inflows.

Borensztein, Gregorio, & Lee (1998) in a study of 69 countries for the period 1970-1989 examine the link between FDI and growth. The result suggests there is a link between FDI and growth. The extent of the link however depends on the available stock of human capital in the recipient countries. Jensen (2003) investigates the relationship between political and democratic institutions on FDI inflows in a set of 114 countries using both time series and panel data analysis that spans 1970 -1998. Findings reveal that democratic and political institutions are positively related to FDI. Democratic governments attract 70 percent greater values of FDI than dictatorial governments. Moreover, Ndikumana and Verick (2008) analyze the two way causal link between FDI and domestic investment in 38 selected SSA countries for the period 1970-2005. The fixed effects and OLS estimators are employed. Result indicates that there are feedback relationship between domestic investment and FDI

in the countries of investigation. The effect of domestic investment on foreign investment is however stronger in terms of significant than the impact of FDI on domestic investment.

The implication of this is that high level of private domestic investment is an indication of high reward to capital which eventually attracts FDI. De Mello (1997) conducts survey on the influence of foreign investment on growth in developing countries. The author concludes that the effect of FDI on growth is conditioned on unobservable country-specific factors. Also it is stressed that for FDI to be growth-promoting in the long run through transfer of knowledge and technologically embodying capital stock, the influence is greater in the low technology than the high technology countries. Also Anyanwu (2011) investigates the relationship between FDI and some macroeconomic variables in African countries for the period 1980-2007. The macroeconomic variables that are regressed on foreign investment are: market size, GDP per capita, liberalization, financial development, inflation, exchange rates, political rights, governments' expenditures and resource endowments. The paper uses OLS estimator with the explanatory variables indicating both positive and negative influence on FDI.

Market sizes, openness, government consumption expenditure, resource endowment all have positive significant influence on FDI. On the other hand GDP per capita, financial development and exchange rate have negative effects on foreign investment. Li and Resnick (2003) analyze the relationship between FDI and democratic institutions in a set of 53 countries for the period 1982 to 1995. Panel

data is employed with the technique of OLS. Result suggests that there is positive relationship between foreign investment and growth. Democratic governance variable proxy as institutional quality leads to increased FDI inflows. Balasubramanyam, Salisu & Sapsford, (1996) investigate the relationship between foreign investment and growth using cross-sectional data. The paper uses both Export Promotion (EP) and Import Substitution strategies (IS) as mechanism of transmitting FDI to growth. This is done by the use of Generalized Instrumental Variable Estimator (GIVE) and OLS estimator for a group of 46 developing countries for the period 1970 to 1985. Separating the countries into EP and IS strategic countries, results show that for the EP countries there is positive significant relationship between FDI and growth.

In the IS countries the relationship between FDI and growth is not significant. The conclusion from the paper is therefore that EP is a better strategy than IS for promoting growth through foreign investment. Benassy-Quere, Coupet & Mayer (2007) investigate the influence of quality institutions and gravity on foreign investment for 52 developing countries for the period 1985 to 2000. The paper uses governance infrastructure in both the recipient and foreign investment source countries to proxy for institutional qualities. Using panel data analysis the paper introduces gravity model to account for the impact of distance measure in influencing FDI. Finding reveals that high level of GDP and reduced distance both have positive significant effect on foreign investment. Moreover the institutional quality variables have significant positive effect on FDI. Ho, Amir, Nasaruddin & Abidin (2013) examine the determinants of FDI in six emerging economies including Malaysia for the period 1977-2010. Empirical finding shows that interest rate,

economic freedom, educated workforce infrastructural qualities are all crucial in the determination of foreign investment for the countries investigated.

The study investigates different factors in the determination of FDI. However the comparing Ho *et al*. study with the present research is in its analysis of interest rate on FDI. Result indicates that interest rate has a negative influence on FDI for some of the countries like China and South Africa though for Brazil the effect of interest rate on FDI is slightly positive. Analyzing the different researches on FDI Ho *et al*. (2013) is the only study that is close to the present study by inclusion of interest rate as one of the explanatory variables. However, Ho *et al.* focus on interest rate and not liberalized interest rate. In addition to this, the subject of focus for Ho *et al*. is some emerging economies rather than SSA countries thus establishing the difference of the present study from that of Ho *et al*.

2.3.6 Studies on Determinants of Capital inflow and its Links with Liberalization

Studies on capital inflow analyze different dimensions of determinations of capital inflows with the relationship between stock market liberalization and capital inflows. Investigating the impact of stock market performance on capital inflows in 18 emerging countries from 1990 to1996, Calvo and Reinhart (1999) find two indices of stock markets to be positively related to capital inflows in these countries. The indices of stock market like market capitalization and number of listed securities significantly influence portfolio inflow while the values of shares traded do not. Also McLean and Shrestha (2002) examine a set of 40 developed, emerging and developing countries from 1976 to 1995 using panel data. From the result the total

capital inflow added together is significant. However estimating individually, only two aspects of capital inflow- foreign direct investment and foreign portfolio investment have significant effect on growth. The index of debt inflow has negative and insignificant effect on growth showing that foreign debts are decreasing the growth rates.

Shen *et al*. (2010) using a panel data that covers 80 countries from 1976 to 2007 analyze the effect of international capital flows on growth through the conditioning factors of twin crises, liberalization, governance, human capital and region. The result reveals that both foreign direct investment and foreign portfolio investment affect growth directly. The conditioning factor that helps to strengthen the effect of FDI on growth is good shareholder's protection. For foreign portfolio inflow, the conditioning factor that helps to strengthen its effect on growth is liberalization. Moreover Calvo, Leiderman & Reinhart (1993) using monthly data for ten Latin America countries discover that external 'push' factors was responsible for capital inflows in Latin American countries. Considering the fact that some of these inflows are prone to external shocks, the authors cautioned against such inflows.

From a slightly different perspective, Fernandez-Arias (1996) opines that domestic and external factors are responsible for increase in capital inflows. The author links both the domestic factors with external factors through creditworthiness. Creditworthiness, according to the author may be a 'pull' or internal factor is however linked to external factor. Creditworthiness means the present value of the available resources for external obligation. The available resources are export

proceeds. The present value implies that these resources would have to be discounted using foreign investors' discount rate meaning that creditworthiness has external factor. It was stated that while 'push' factor (international interest rate) is important, the ability to pay of the recipient countries is also important. Citing the case of SSA region with high interest rates but still unable to attract foreign inflow due to the low creditworthiness.

Brana and Lahet (2010) also find that foreign investors' appetites for risk coupled with abundance world liquidity as well as low interest rates in Japan are some of the factors 'pushing' capital inflows to the Asian countries. Kim and Yang (2009) examine the influence of capital flows on domestic asset prices in Korea. The results show that capital inflows have contributed to the increase in stock prices in Korea. Frankel and Okongwu (1995) examine interest rates convergence in nine Latin America and East Asian countries for the period 1987 to 1994. The paper investigates the reasons for high interest rates in emerging countries. The interest rates in emerging countries do not converge to U.S level irrespective of capital market liberalization and portfolio capital inflows. The result among others in conformity with Calvo *et al.* (1993) and others reveals that low world interest rate in US is a major factor in driving new inflows to developing countries. Result also negates the views that existence of a country risk as the reason why interest rates in the recipient countries remain above US rates. A common feature of the review studies on capital inflows is that they all focus on Latin America and Asia. Minimum attempt has been made to examine the direction and determinants of the inflows to SSA region.

2.3.7 Studies on Total Factor Productivity

Collins and Bosworth (1996) in the determination of the source of East Asian growth, examine data for 88 developed and developing countries for the period 1960-1994. The study uses empirical framework that divide output growth per worker into factor accumulation and a change in productivity. The paper discovers that the source of the East Asian miracle is increase savings that induce rapid investment rather than improvement in TFP. De Mello (1999) in a time series and panel data for the period 1970-1990 examines the link between FDI and TFP in Organization for Economic Cooperation and Development (OECD) and non-OECD countries. Result shows that in the OECD countries there is a link between FDI and productivity change. However the country-specific factors may be inhibiting the transfer of technology from FDI to technical efficiency in the non-OECD countries. Herzer (2012) investigates the relationship between domestic investment and outward FDI through changes in productivity in Germany. Using time series data for the period 1980 to 2008, the paper investigates both short and long run relationship between domestic investment output and FDI outflows on one hand and the relationship between FDI outflow and productivity change on the other hand.

Result shows that FDI outflow has a long run positive relationship between domestic output and TFP. Also there is a bi-directional causality between outflow of foreign investment and productivity. Safdar Ullah (2005) investigates the determinants of technical efficiency in Pakistan for the period of 1960-2003. Finding indicates that openness to trade, educational expenditure both have negative link with TFP in Pakistan however FDI is positively related to technical efficiency in Pakistan. Abdullah (1997) investigates the contribution of TFP growth to the production of

Malaysian rice sector for the period 1980 to 1990. The paper uses both Tornqvist index number and parametric procedures in determining both scale and technological change effects as sources of TFP growth. Computation of the TFP yields the same value using the two approaches of index number and parametric methods although technological change method is determined through parametric approach. The conclusion from the paper is that using the parametric approach, the average contribution of TFP growth to Malaysian rice productivity is 1.37 percent. Out of this value, technological change contributes 1.08 percent while the scale effects contribute 0.29 percent.

Thus the contribution of technological change to TFP growth to Malaysian rice productivity is higher than that of scale effects for the period of 1980 to 1990. This empirical result negates the view of (Nishimizu & Page, 1982) which states that developing countries can only attain TFP growth through technical efficiency. Fare *et al*. (1994) examine the determinants of productivity growth in 17 OECD countries using nonparametric programming method. Two measures of productivity are investigated that is technological progress and efficiency change. The results indicate that US productivity growth is above average in the group, all of which are attributable to technological change. Japan has the highest rate of growth with part of the change being caused by technical efficiency. Moreover, Nishimizu and Page (1982) using an estimated trans log parameter for 26 social sector in Yugoslavia for the period 1965-70 find that TFP is attributable to technical efficiency in Yugoslavia. Karim (2000) examines the productivity growth of five ASEAN countries for the period 1978-1990 using the Malmquist index approach.

The paper investigates whether productivity change among the ASEAN countries is through technological change which is innovation or technical efficiency. Findings reveal that there has been on average a reduction of 0.5 percent in TFP growth in the region during this period. The breakdown of the results shows that Singapore has the highest growth in TFP of 2.2 percent which is attributed to technological change and technical efficiency. On the other hand Indonesia has the lowest form with a negative TFP of 3.1 percent most of which is attributable to low technical efficiency. Miller and Upadhyay (2000) in a panel data of 83 countries over the period 1960-89 discover that openness and human capital affect TFP. However for low income countries human capital interacts with openness to achieve positive effects on TFP. Griffith *et al*. (2003) examine the relationship between foreign investment and productivity in United Kingdom (UK) establishments. The paper uses data on 200 UK industries for the period 1980 to 1992 to investigate the effect of foreign multinationals on the productivities of domestic industries. Findings reveal that average annual TFP accelerates for the period 1980 to 1988 implying that FDI has positive effect on TFP in UK.

Baier *et al.* (2004) investigate the important of growth of both physical and human capital and TFP for 145 countries using data from 1970 to 1999. Organizing the countries according to regions, the paper examines the changes in physical capital per worker, output per worker, human capital per worker and total factor productivity per worker for the period. Result shows that the Western countries which are the most advanced region in the study have TFP growth which is 25 percent of output growth; Southern Europe has 20 percent and the Newly Industrialized countries' result is 18 percent. On the other hand Central and Southern African countries have

negative TFP. Furthermore, Senhadji (2000) examines the reasons for differences in TFP among countries for 88 countries for the period 1960-1994. Dividing the countries into different regions, the author estimates the contribution of physical capital and TFP to growth by each region. In this analysis Africa has the lowest TFP growth -0.56 among the regions. For East Asia it was 0.28 while South Asia had TFP growth of 0.55. This is followed by Latin America also with low TFP growth of -0.3 during the period.

Another revelation from this study is that the low estimate of output elasticity with respect to capital is 0.43 for SSA nations. Other regions like the industrialized countries have 0.64, Middle East and North Africa has 0.63, Latin America is 0.52 and the East Asia is 0.48. This result contradicts theory which predicts high marginal productivity of capital for the developing countries. Concluding the paper stated that the contribution of TFP to growth is consequent upon the value of share of capital stock in output. If the share of capital stock in output is high then the contribution of TFP to output will be low and vice versa. Pratap and Urrutia (2012) examine the effect of financial crisis friction on TFP by using a hypothetical two model approach for Brazil using the high interest rate period. Using example of two models of consumer goods and intermediate goods sectors, the paper shows that reduction in working capital or constrain in working capital leads to hike in interest rate and thus lead to decrease in aggregate output which reduces TFP and finally output growth.

The paper also shows that the same financial crisis adversely affect the exchange rate leading to depreciation of the domestic currency. Moreover Acemoglu and Zilibotti

(1999) stress that technological mismatch is the main reason behind the technological difference between the advanced and the developing countries. The paper states that if all countries have access to the same technology there would still be differences in technology because labour in the developing countries are low skilled and as such are unsuitable for modern technology. The paper further analyzes that international trade and provision of property rights are the means of reducing the difference in productivity between the advanced and the less developed countries. Nelson and Phelps (1966) introduce a model of technological diffusion where greater role is placed on human capital in technological diffusion. The paper stresses the importance of education in order to attain technological progress.

It is stressed that the physical capital needs to be complemented with human capital in other to attain high growth rate of the economy. The technological gap between the technological leaders and the followers nations depend on the level of education of the followers' countries. Technical knowledge flows from the leaders to the followers' countries and uplift the TFP of the followers. Benhabib and Spiegel (2005) explaining the relationship between human capital and productivity design a model specification to determine the extent of human capital contribution to TFP. This is examined among 84 countries for the period 1960 to 1995. Finding indicates that human capital is a means of invention and a mechanism of closing the gap in TFP between the leader and the follower countries. Rivera-Batiz (2002) analyzes the influence of democratic governance on technical change for a group of countries for the period 1960 to 1990. This is shown through the mediating role of quality of governance.

The paper uses data for 59 developed and developing countries. Result suggests that democracy through its interaction with quality governance has positive significant effect on TFP growth in those countries. Moreover, Berument, Dincer & Mustafoglu (2011) analyze the influence of macroeconomic instability on productivity change using quarterly data for the period 1987 to 2007 for Turkey. Inflation openness of an economy and financial market are the measures of macroeconomic indicators and the volatility of these indicators are the indication of macroeconomic instability. The paper uses Vector Autoregressive (VAR) model to examine conditional variability of openness, inflation and financial market on TFP. Finding reveals that volatility in inflation has significant positive effect on productivity while openness and financial market volatility are negatively related to TFP.

Yao (2015) using panel data for the period 1992 to 2010 for China's 28 provinces examines the TFP growth among the provinces as well as the entire country. Two dummies represent both the Eastern and the Western regions. Result shows that the Eastern regional dummy enhances TFP while the Western regional dummy obstructs TFP. The implication of this is there is difference in the pace of economic growth of individual regions. The period of investigation is divided into two 1992-1997 and 1998-2010. The estimation was done for both the entire economy and the industrial sector. Findings also indicate that for the period 1992-1997, the industrial sector growth was slow compared with 1998-2010 when the growth increased again. The general conclusion is that while the overall economy of China has been increasing since 1983, the contribution to TFP from the industrial sector witnesses a slowdown. Kathuria (2014) using Tornqvist Divisia index analyses the productivity growth in India's organised manufacturing sector for the period 1980-81 to 2005-06. Dividing

the period of analysis to two- 1980-81 to 1990-91 and 1991-92 to 2005-06, finding suggests that the growth in productivity during the earlier period of 1980-81 to 1990-91 is low.

The period of 1980-81 to 1990-91 is regarded as the pre-reform period while the later period of 1991-92 to 2005-06 is the post-reform period. Averagely most of the industries recorded TFP growth among different states. The increase productivities among the industries are due to technical efficiency emanating from the macroeconomic reform such as better resource utilization and improvement in physical and financial infrastructures. Furthermore, Hong and Sun (2011) examine the influence of Foreign Direct Investment (FDI) on TFP in China. This is done by using panel data for 29 provinces for the period 1980-2005. Modelling TFP growth as the dependent variable and incorporating the impacts of intra-regional FDI spill over, factor mobility and structural change among others as the explanatory variables, the paper suggests that FDI has an influence on TFP. The procedure takes into cognisance the endogeneity problem from lagged dependent variable as well as the endogeneity of the independent variables using the General Methods of the Moments (GMM). Results of the estimation suggest that spill over from external FDI as well as structural change increase the TFP growth and incomes of the provinces.

Mention must be made of the fact that the present study is not focus on determining the sources of TFP but rather on examining the effect of FDI inflows on productivity change for the selected SSA countries. Reviewing the past studies shows that studies on SSA region of the long term effect of FDI on productivity change as measured in TFP are either sparse or non-existence.

2.4 Relationship between the Dependent Variables and the proposed Explanatory Variables

The section analyses the theoretical links among the dependent variables and the proposed explanatory variables in the models of study.

2.4.1 Relationship between Stock Market Development and Stock Market liberalization

The stock market development is measured through market capitalization, value traded and turnover ratio. Liberalization of stock market entails that more foreigners invest in the stock market. This leads to greater liquidity of the stock markets and the stock market capitalization (Henry, 2000). Liberalization of stock markets means that foreigners are involved in buying of shares in the liberalizing countries' stock exchange. The effect is that more shares are traded than before and this would lead to stock market boom which would further drive up the prices of stock (Calvo & Reinhart, 1999; Henry, 2000). Higher stock prices translate to greater participation of investors in stock market which increases the market capitalization. More foreign participation due to liberalization of stock market means that more shares are traded and this lead to high turnover ratio thus translating to greater stock market development.

Stock market liberalization has positive effect on valuation of stock, stock prices (Henry, 2000; Kim, Kim & Sung, 2013). According to Henry (2000), standard asset pricing theory suggests that stock market liberalization may reduce the liberalizing country's cost of equity capital. This is because stock market liberalization allows for risk sharing between domestic and foreign agents. If stock market liberalization leads to reduction in the aggregate cost of equity capital, assuming the expected future

cash flow is fixed, there should be an increase in a country's stock price index when the market learns of impending stock market liberalization. The stock price measures the proportion of dividends yields to the discount rate. The discount rate consists of both the risk free rate and the risk premium. In a situation where the stock market liberalization leads to reduction of risk premium, this reduces the discount rate.

Holding expected future cash flow constant, there may be increase in stock prices as a result of reduction in risk premium (Henry, 2000). Stock market liberalization also has positive effect on capital inflow in the SSA countries (Brafu-Insaidoo & Biekpe, 2013). Removal of restrictions on foreigners' acquisition of shares leads to more foreigners' participation in the domestic equity market thus leading to more foreign investment and inflows. The basic underpinning theory supporting the linkage between stock market liberalization and capital inflow has its root in the seminar work of M-S. The theory postulates that countries should shore up their domestic savings by opening up their economies in order to attract the necessary foreign inflows. In other words countries should liberalize their domestic financial markets, open up their capital accounts so that they can attract the necessary capital inflows for development. In this way, they can take care of shortfall in consumption, investment and productivity (Calvo & Reinhart, 1999).

One of the transmission mechanism by which liberalization affects capital inflow is through the effects on foreign direct investment (FDI). The reduction of control on FDI can lead to increase in FDI inflow through the removal of quantitative limits of ownerships and investments in production and the provision of tax incentives (Brafu-Insaidoo & Biekpe, 2013). Liberalizing FDI can also lead to the support and the

expansion of domestic firms by complementing productivity or by increasing productivity through the spillover of advanced technology (Boresztein *et al*., 1998) Among the major components of capital inflow (FDI, portfolio equity inflow and debt), FDI and portfolio inflow are less prone to reversals and are more stable (Calvo & Reinhart, 1999; Kose *et al*., 2009; Shen *et al*., 2010). FDI theoretically increases the level of inflow through its effect on transfer of technology and managerial experts (Kose *et al*., 2009).

2.4.2 The Linkage between Interest Rates, Stock Market Development and Financial Development

According to M-S interest rate is the main transmission mechanism through which savings influence investment and increase capital inflow. Savings from this perspective is linked to investment through interest rate which increases inflows of investible funds. Higher level of interest rates attracts greater savings thereby encouraging capital inflow. Grossman and Shiller (1981) postulate that high level of economic boom leads to high real interest rate. High real interest rate would lead to greater future consumption in relation to present consumption and thus lead to high level of stock prices. Another way through which interest rates influence the productivity of capital is the fact that higher real interest rate raises the relative price of capital. This encourages more intensive use of capital and capital-labour substitution (Sundararajan, 1987). Moreover, there are different links through which interest rates can affect the equity portfolio of an economy, and development of the stock market. The indirect channel is through the debt-equity mechanism. The debt-equity is the financial structure of a firm that measures the ratio of debt to equity of a firm. If the interest rates on loans to the firms are high, this would compel most firms to shift to the use of equity finance rather than debt finance.

There is also the portfolio channel that directs savings from low yielding self-finance to financial assets with greater yield (Sundararajan, 1987). Increase in stock prices thus gingers the development of the stock market. However, De Gregorio and Guidotti (1995) observe that interest rates are poor indicators of financial development and financial intermediation. According to the authors, most of the empirical studies that find positive relationship between interest rates and growth did not establish the specific channel of transmission from real interest rate to growth. A more fundamental critique of the M-S hypotheses is the literature focusing on policy credibility. The literature stressed that high real interest rate may reflect factors that are not related to marginal productivity of capital. It may reflect other factors like outright repudiation of government obligation, expectation of inflation and lack of credibility of economic policy (De Gregorio & Guidotti, 1995). In such situation, it would be difficult to ascribe high interest rates to high level of economic activities more so it might not affect stock market development since it is a source of macroeconomic maladjustment.

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2.4.3 The Link between Liberalization and FDI Inflow

Capital inflow according to Shen *et al*. (2010) consists of foreign direct investment, foreign equity portfolio investment and debt. For the sake of the present study however, interest is focused on FDI inflow rather than the entire components of capital inflows. There is a general consensus about the desirability of FDI inflows. It augments consumption thereby improving the welfare of the citizens and investment. This is because increase in foreign investment inflows affords citizens the opportunities to purchase and consume goods and services they would not have had hitherto (Calvo, Leiderman & Reinhart, 1996).

Notwithstanding this however, there is a possibility of reversal of capital inflow (Calvo & Reinhart, 1999; Shen *et al*., 2010). Reversal comes in form of repayment of short-term debts in case of debts. It includes the withdrawal of foreigners' funds from investing in the domestic economies or closing of foreign affiliates or branches in case of FDI. In support of this, Singh (2003) cautions against the long term desirability of FDI inflows. He posits that the differences between FDI and portfolio investment is weakened by the growth in derivatives and hedge funds. According to him it is observed that long-term investment can be easily converted to instant liquid asset. A direct investor can use his/her long-term asset to borrow so as to export capital and thereby generate rapid capital outflows. Moreover, the debt burden of paying back earlier contractual obligation lead to the reversals in debt inflows.

The major discussion in the literature surrounding the reasons for the surge in capital inflows focus on both the 'push' and 'pull' factors. The push factors are the external environment like the low US interest rates that drive or push capital to the developing countries. The pull factors are the improvements in the macroeconomic stability of the recipients' countries that helped to attract capital to such countries. In his own submission, Fernandez-Arias (1996) stressed that domestic pull factor may be enhanced by the external push factors. Using the example of creditworthiness which is a domestic factor, creditworthiness is the present value of resources available for external obligation. The present value feature of the creditworthiness means that it has to be discounted by foreign interest rate which makes the creditworthiness to have external influence.

There is the possibility of endogeneity between liberalization and capital inflow (Calvo & Reinhart, 1999). This is because increase in world liquidity or financial liberalization may lead to more foreigners establishing industries in the domestic economies and enhancing greater foreign inflows. These lead to more market friendly and business environment that further encourages more foreign participation in the domestic economy. The authors stressed that while liberalization may influence the volume of inflow, capital inflow in form of FDI and portfolio inflow may also cause greater and competitive environment.

2.4.4 Link between Institutional Qualities, liberalization and Stock Market

Quality of institutions is another variable which affects the manner in which liberalization has effects on stock market development and capital inflows. According to studies like Henry (2006), Arteta *et al*. (2001), Kaminsky and Schmukler (2003), Shen *et al*. (2010), Yartey (2008), institutional qualities affect the extent to which stock market liberalization leads to greater capital inflows and economic growth. Such quality of institutions like supervisory and regulatory framework, law and order, political stability and enforcement of property rights go a long way to influence the efficiency of financial liberalization. It is expected that liberalization should have a positive influence on FDI inflow through strong institutions. The ability of liberalization to be effective in the developing countries has been found to be dependent on strong quality institutions that are absent in the developing countries (Henry, 2006; Obstefeld, 2009).

The authors asserted that inadequate quality institutions like supervisory and regulatory framework, weak enforcement of property rights, are responsible for the inability of the stock market liberalizations to affect stock market developments in the developing countries. Country risk is another variable that is likely to affect foreign investors' attitude towards investing in the domestic stock markets for the stock markets liberalization to be able to influence stock market development. In explaining the importance of this country risk Mankiw (2011) stresses that the developing countries' interest rate cannot be at the same level with the advanced countries. He justifies the inclusion of country risk in the determining factor of interest rate of the developing countries. Country risk in form of political instability, government expropriation, are some of the problems plaguing the developing countries. It is on the basis of this that foreign investors are demanding for higher price in form of high interest rate to guard themselves against such risks as exchange rate risk, risk of expropriation among others.

2.4.5 Link between FDI Inflow and TFP

FDI may lead to technological transfer through spillover or technical know-how to local firms. Acquisition of technical knowledge can be through, research and development, training or scientific discovery. Embodiment of this research is reflected in better structure of organization or new equipment. New equipment or better structure of organization transform to higher quality or increased quantity at lower costs which entails more productivity (Nadiri, 1970). Another theoretical link between FDI and TFP is that foreign investment can transfer technology to local firms so that the local firms can improve their productivities through imitating the technology of the foreign firms.

2.4.6 Summary of Gap in the Literature

Cursory look at all the foregoing analysis reveal that the influence of interest rate liberalization on growth has been extensively studied in the literature. Omole and Falokun study the effect of interest rate liberalization on financing structures of firms in Nigeria. Studies linking financial liberalization to growth, investment and cost of capital also abound in the literature. However the influence of liberalized interest rate on stock market development has not been studied to the best of our knowledge. In the same way several attempts have been made to examine the effectiveness of stock market liberalization on growth and other macroeconomic variables in the developing countries. Suffice to say that no effort has been made to investigate the actual impact of the stock market liberalization on the stock market itself. In addition to this the influence of foreign investment on productivity is vital for the enhancements of productivity especially in the developing countries. The issue of impact of FDI on productivity has been studied for some regions in the developing countries. It has however not been studied for the region of SSA. These issues establish the rarity of the present study.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The methodology chapter discusses the theoretical framework underlining the research. The models to be adopted for the study will be introduced in Section Two. This will be followed by the justification of the variables to be used in the models in Section Three. Section Four discusses the types of data and data collection. The sources and method of data collection are in Section Five. Section Six is on method of analysis while the chapter ends with a conclusion of the whole chapter.

3.2 Theoretical Framework

The study discusses separate theoretical framework for each of the dependent variables explaining the relationships between each of the dependent variable with the proposed explanatory variables. From this framework, the models to be estimated are derived.

3.2.1 Theoretical Framework for Stock Market Development

Financial liberalization theory and the theory of stock market development are the underlining theories for objectives one, two and four. Liberalization of the stock market is supposed to increase the development of the stock market through stock market liquidity (El-Wassal, 2005; Yartey, 2008). According to the concept of stock market development, the development of stock market which is proxy by market capitalization scaled by GDP is influence by increase in income, quality institutions,

stock market liberalization, macroeconomic stability and stock market liquidity. This is due to the fact that liberalization leads to increase in interest rate. High interest rate discourages domestic investment since investors in the stock market also borrow from the interest rate market. High interest rates also attract foreign investors in as much as high interest rates indicate greater returns. The extent to which high interest rate would pull investors to the domestic economy depend on the magnitude of returns that result from high interest rate and the high interest rate as costs. Furthermore, the quality institution will have positive influence on the development of stock market. Improvement in supervisory and regulatory framework will increase investors 'confidence in the stock market.

Theory also postulates that liquidity which is proxy by turnover ratio in this study will have positive effect on the development of stock market. The higher the liquidity of the market the greater the transaction in the stock market and this promotes stock market development. Theoretically, financial development as measured in domestic credit to the private sector scaled by GDP will have positive influence in the stock market development. It reflects the influence of banking sector on stock market development. The study employs El-Wassal (2005) and Yartey (2008) models of stock market development as developed by Calderon-Rosell (1990) to form the analytical model for the present study. For the purpose of the present analysis, two separate stock market development models would be estimated. This is in order to see the individual effects of each of the explanatory variables of interest rate liberalization and stock market liberalization on stock market development.

3.2.2 Theoretical Framework for Foreign Direct Investment

The important of factors such as interest rate and quality institutions in driving foreign investment is examined by authors. Interest rate is seen as cost of capital to the investors hence the expected negative relationship between FDI and interest rate (Ho *et al.*, 2013). Furthermore, foreign interest rate in form of US Treasury bill is another determinant of FDI. United States Treasury Bill (USTB) is used to proxy for foreign interest rates. This is because USTB represents risk-free rate of return. A risk-free rate of return is the reward expected by investors for investing in the venture. Realistically however a risk free rate of return does not exist and the interest rates on three months USTB is often used to represent the risk-free rate.

The theoretical postulation is that low interest rate in the industrial countries is one of the factors pushing FDI to the developing countries (Calvo *et al.*, 1996). Low interest rate and low level of economic development in the industrial countries are part of the factors driving -FDI into the developing countries (Fernandez-Arias, 1996). The relationship between foreign investment inflows and foreign interest is expected to be negative going by theoretical postulations of capital inflows. Low interest rate in the industrial countries would encourage foreign investors to seek investment elsewhere. High level of income manifest in high level of economic growth is another determinant of FDI.

This is based on the premise that high level of growth in developing countries would strengthen the proposed market for the foreign investors to establish industries. In order for FDI to contribute to economic growth, the host countries must have strong

financial base among other factors (Alfaro *et al.,* 2004). Institutional quality is another explanatory variable for the FDI model. Improved quality institutions would shore up investors 'confidence in investing in the developing countries. This would eventually attract more foreign participation in the domestic economies. Quality of institutions in form of supervisory and regulatory framework; democratic and politically stable governments; lower corruption all build up confidence in the foreign investors and is part of the attraction of foreign investment to the developing countries. Theoretically, institutional quality should have positive influence on the development of the stock market. FDI model of Asiedu (2006) is employed to implement the objective of FDI and liberalized interest rate.

3.2.3 Theoretical Framework of the Total Factor Productivity

The neo-classical growth model shows that the elasticity of output in relation to capital is the same as the capital share of total output. The growth accounting regression leaves a large portion of the output elasticity with regard to capital unexplained. The high estimates of output elasticity with regard to capital have been recently interpreted as a reflection of capital endogeneity in the production process and should be incorporated with additional input without diminishing returns. On the grounds of econometric terms, high estimates of elasticity can be the result of omitted variables and are treated as the error term. TFP is thus mirroring the high elasticity's estimate of per capita capital stock which is the difference between the change in productivity and the actual per capita capital stock (De Mello, 1997).

In deriving the TFP Solow uses total differentiation to divide output growth into two: growth of factor inputs scaled by their respective contributions and the efficiency parameter. In a situation where each of the labour and capital inputs is paid their prices, then the production function would be equal to the marginal product of each of the input plus the efficiency parameter. Using the production function curve, the growth rate of factor input reflects the movement along the production function. The rate of efficiency represents the shift of the entire production function (Hulten, 2001). The TFP residual is thus model:

$$\Re_t = \frac{\dot{X}_t}{X_t} - s_t^c \frac{\dot{C}_t}{C_t} - s_t^L \frac{\dot{L}_t}{L_t} = \frac{\dot{A}_t}{A_t} \tag{3.1}$$

where $\Re_t$ is the residual which is output growth rate that is not accounted for by growth in factor inputs, $\frac{\dot{X}_t}{X_t}$ is the output growth rate, $\frac{\dot{C}_t}{C_t}$ represents the capital growth rate, $\frac{\dot{L}_t}{L_t}$ shows the growth rate of labour s^c and s^L are rewards for both capital and labour respectively while $\frac{\dot{A}_t}{A_t}$ signifies the efficiency parameter.

Theoretical argument is that marginal return to capital is expected to be high in developing countries thus increasing the probabilities of these countries to imitate and improve their growth levels through the efficiency parameters thereby increasing TFP (Collins & Bosworth, 1996; Hulten, 2001). However empirical evidence shows that while some countries have been able to 'copy' the advanced countries' technologies, others in the SSA nations have not been able to do that. This may be due to deficiencies in human capital and poor institutions among other factors (De

Mello, 1999; Senhadji, 2000). TFP or productivity change, according to different literatures is determined by: openness to international capital; the availability of human capital. Existence of human capital determines the ability of the developing countries to actually adopt the foreign technology.

Other determinants of TFP according to scholars are: macroeconomic development level of an economy; FDI; liberalization of the financial sector; foreign interest rate and quality institutions among other factors. Positive link has also been established between foreign investment and productivity change. Technology spillover from FDI is the mechanism of transmission of technology from FDI to TFP improvement in the recipient countries (De Mello, 1999; Safdar Ullah, 2005). Good quality institutions in form of enforcement of law and order, reduction in bureaucratic bottlenecks, implementation of property rights all go a long way to increase efficiency in the means of production thereby increasing TFP.

Considering the fifth research objective; the discussion of 2.2.4 on the different types of TFP and the theoretical framework on productivity of 3.2.3, the present analysis focus on non-frontier method of measuring TFP using parametric method. The influence of FDI on technical change is thus examined. The TFP model is derived from residual of the production function by employing the methods of Berument *et al.* (2011), Herzer (2012) and Miller and Upadhyay (2000). This forms the dependent variable from which the FDI and other explanatory variables are determined going by the literature.

3.3 Estimable Models

This section discusses the different models to be estimated base on the objectives in chapter one; the literature discussed in chapter two and the theoretical framework in section 3.2.

3.3.1 Stock Market Development Model 1

Stock market development is evaluated using the different means of measuring the stock market like the size, liquidity, volatility and concentration. For the present analysis however market size as proxy by market capitalization is the means of measuring stock market development. Market size is measured by the market capitalization which is the number of listed securities scaled by the GDP. Liquidity of stock shows the extent at which the shares are traded on. It reflects the cost and ease with which investors are able to buy and sell shares. Large exchange with high volume of trading and low transaction costs exhibit a better developed stock market. Stock market development is one of the dependent variables for the present analysis. Two models of stock market development are specified. The first model of stock market development is developed to answer the research questions one and two with both interest rate liberalization and institutional quality as the explanatory variables of interest.

The second stock market development model which is specified in Equation (3.6) is to answer the fourth research question. It focuses on influence of stock market liberalization on the development of stock market. The present analysis measures the

development of stock market by the market capitalization and this is in line with Calderon-Rossell (1990), El-Wassal (2005) and Yartey (2008).

The original Calderon-Rossell (1990) model is $Y = LP$ (3.2)

where Y is the market capitalization in local currency, L represents the number of listed companies in the stock exchange and P is the domestic currency average price of listed companies.

Yartey (2008) model is:

$$S_{it} = \alpha_i + \vartheta S_{it} + \partial M_{it} + \beta L_{it} + \varepsilon_{it} \quad (3.3)$$

In Equation (3.3), which is the existing model of Yartey (2008) from where the stock market development model for the present analysis is derived, S_{it} is the market capitalization, α_i is the country specific fixed effect, M_{it} are the macroeconomic variables of GDP per capita, credit to the private sector, gross domestic investment as a percentage of GDP, stock market value traded as percentage of GDP and macroeconomic stability proxy by inflation and real interest rate. The L_{it} represent the indices of institutional quality like political risk, corruption, law and order while the error term is ε_{it}.

In modifying Equation (3.3), Equation (3.4) that is the stock market model for the present analysis is derived thus;

$$MCAP_{it} = \alpha_i + \beta_1 RLIB_{it} + \beta_2 TRNV_{it} + \beta_3 DCPS_{it} + \beta_4 INSTI_{it} + \\ + \beta_5 RGDP_{it} + \varepsilon_{it} \quad (3.4)$$

In Equation (3.4), *i* represents individual country of the selected SSA countries *i*=1, 2…..*N*, *t* is the time period which is *t* 1, 2….*T*. $MCAP_{it}$ is the dependent variable representing the stock market development in the selected SSA region. It is measured by stock market capitalization scaled by GDP. *RLIB* is the index of interest rate liberalization; *TRNV* is the proxy for stock turnover ratio. *DCPS* is the credit to the private sector. *INSTI* represents the quality of institutions and *RGDP* is the real GDP that measures the level of economic growth and ε_{it} signifies the usual error term. Equation (3.4) is the first stock market development model and it is taking care of objectives one and three. The present model is different from the existing models of Calderon-Rossell, El-Wassal and Yartey in that the present model is investigating the impact of liberalized interest rate on the development of stock market. The independent variables investigated by existing models of El-Wassal and Yartey are: income level; banking sector development; savings and investment; stock market liquidity; private capital flows; financial liberalization; institutional quality and macroeconomic stability.

3.3 2 Foreign Direct Investment Model

FDI is a deliberate strategy of firms in establishing industries in the domestic economies considering different cost structures resulting from differences in factor endowment among countries that justify such cross-national investments. FDI is determined by natural resources, quality institutions and human capital (Asiedu, 2006). It is also influenced by strong financial structure (Alfaro, *et al.*, 2004). For the present analysis in deriving FDI model, the FDI model of Asiedu (2006) is adopted with some modifications:

$$FDI_{it} = \alpha_i + \nu_1 Natu_{it} + \nu_2 GDP_{it} + \nu_3 POLINST_{it} + \nu_4 Institu_{it} + \nu_5 PolVar_{it} + \\ + \varepsilon_{it} \quad (3.5)$$

FDI_{it} measures the FDI inflow as a percentage of GDP it is the dependent variable. The explanatory variables for the existing Asiedu model are $Natu_{it}$ that measures the existence of natural resources in form of crude oil in the domestic countries; GDP_{it} is proxy for the size of the country's market size; $POLINST_{it}$ measures political instability which includes the number of coups, assassinations and other political unrests; $Instituti_{it}$ represents quality institutions such as corruption, enforcement of law. $Poly\,\text{var}_{it}$ measures the policy variables such as infrastructural development, human capital macroeconomic stability.

From Equation (3.5), the FDI model for Asiedu is the FDI inflow as a ratio of GDP which according to the author is being determined by natural resources, political instability in the region of SSA, quality institutions, market size as measured in GDP and policy variables of the host countries. Equation (3.6) is the FDI inflow model for the present analysis is derived by modifying (3.5) thus:

$$FDI_{it} = \kappa_i + \partial_1 RLIB_{it} + \partial_2 RGDP_{it} + \partial_3 DCPS_{it} + \partial_4 USTB_{it} + \\ + \partial_5 INSTI_{it} + \varepsilon_{it} \quad (3.6)$$

In Equation (3.6), *i* represents individual country of the selected SSA countries *i*=1, 2…..*N*, *t* is the time period which is *t* 1, 2….*T*. *RLIB* is the index of interest rate liberalization, *RGDP* indicates level of economic growth, *INSTI* is the proxy for quality institution. *DCPS* is domestic credit to the private sector as a percentage of

GDP and *USTB* is the foreign interest rate and ε_{it} signifies the usual error term. The equation for FDI which is (3.6) is different from equation (3.5) existing model of (Asiedu) in the sense that the equation for the present study includes both interest rate liberalization index and foreign interest rate in the specification.

3.3.3 Stock Market Development Model 2

Based on the discussion of (3.3.1) on the development of the stock market development model, the second stock market development model is derived to take care of the third research objective of impact of stock market liberalization on the development of stock market itself. The approach is to adopt the Yartey (2008) model of (3.3) and modify it by including the stock market liberalization index as the main explanatory variable of interest hence the second stock market development model for the present study is:

$$MCAP_{it} = \phi_i + \varpi_1 SLIB_{it} + \varpi_2 DCPS_{it} + \varpi_3 USTB_{it} + \varpi_4 RGDP_{it} + \varepsilon_{it} \quad (3.7)$$

In Equation (3.6), *i* represents individual country of the selected SSA countries *i*=1, 2…..*N*, *t* is the time period which is *t* 1, 2….*T*. *SLIB* is the stock market liberalization index, *DCPS* is domestic credit to the private sector, it is measuring the financial development through the banking unit. While the dependent variable which is *MCAP* is also measuring financial development, the rationale for including *DCPS* in this model is to investigate the influence of the banking sector on the stock market development. *USTB* represents the foreign interest rate and *RGDP* is the real GDP which measures the level of economic growth. The Equation (3.6) is in line with

Yartey (2008). However the present model is different from Yartey's model because foreign interest rate is included in the specification of our model.

3.3.4 The Production Function

The derivation of the TFP model is based on the approaches of Berument *et al*. (2011), Herzer (2012) and Miller and Upadhyay (2000). The TFP model is derived from the estimation of Cobb-Douglas production function. The residual from the estimation of the production function constitute the series for the TFP for the present analysis. The production function for the computation of the residual that constitute the TFP is thus:

$$Y = AK^{a}H^{b}L^{\delta} \tag{3.8}$$

$$0 < a < 1,\ 0 < b < 1 \ \ and \ \ 0 < \delta < 1$$

where Y is the real GDP, A is the proxy for TFP (technical efficiency), H is measuring human capital, and L is the labour force. The model assumes non-constant returns to scale by not imposing $(a+b)$ or $(a+b+\delta)$ to equal one. Dividing equation (3.8) by labour force expresses the output, capital stock and human capital on the basis of per worker thus:

$$y = Ak^{a}h^{b}L^{a+b+\delta-1} \tag{3.9}$$

where y is real GDP per worker, k is the physical capital per worker, h measures stock of human capital. The production function exhibit increasing, constant and decreasing returns to scale where $(a+b)$ or $(a+b+\delta)$ are greater than, equal to or less than one respectively.

Linearizing equation (3.8) gives:

$$y = A + ak + bh + (a + b + \delta - 1)L \tag{3.10}$$

Rewriting equation (3.9) in natural logarithms form yields:

$$\ln y = \ln A + a \ln k + b \ln h + (a + b + \delta - 1) \ln L \tag{3.11}$$

from the specification in equation (3.9) of Miller and Upadhyay model Equation (3.12) is derived thus:

$$\ln RGDP = \varpi_0 + a \ln gfk + b \ln Hcap + \delta \ln Lft \tag{3.12}$$

where $\ln RGDP$ is the log of real GDP of the individual selected countries in the SSA. $\ln Gfk$ measures the log of capital stock for the same group of countries which is proxy by gross fixed capital formation. $\ln Hcap$ measures the log of human capital for the respective countries and $\ln Lft$ measures the log of total labour force. a, b and δ are coefficients of capital stock, human capital and labour respectively. They are the output elasticity with respect to capital stock, human capital and labour respectively. The approach is to estimate equation (3.12) using elasticity of output with respect to capital of 0.4 taking the reward for capital from the national income figures of the respective countries. In essence the approach is that the reward for capital which is the marginal product of capital is assumed to be 0.40 percent based on the national income figures of individual countries assuming that the developing countries share common technology. Furthermore the elasticity of output with respect to both labour and human capital is jointly 0.60 for SSA countries. This is following the approach of Senhadji (2000).

3.3.5 Total Factor Productivity Model

The total factor productivity model is derived from the production function in line with Berument *et al.* (2011); Herzer (2012) and Miller and Upadhyay (2000). Productivity is the rate of change in output as a result of change in input. It can be measured either through the partial measure of factor inputs or the multifactor index measure. The partial index measures either the average labour or the average capital. The multifactor or total index on the other hand measures output per unit of labour in combination with output per unit of capital. The partial measure of productivity is:

$$AP_L = X/L; AP_K \; X/K \tag{3.13}$$

Total Productivity Index:

$$A = X/(\alpha L + \beta K) \tag{3.14}$$

where X, L and K are aggregate output level, labour and capital α and β are appropriate weight of labour and capital respectively. The two major methods of measuring productivity are Kendrick (1961) arithmetic measure and Solow (1957) geometric index (Nadiri, 1970). Kendrick approach to measuring TFP is through a distribution equation where he assumes homogeneity in production function thus:

$$dA/A = \frac{X_1/X_0}{(wL_1 + rK_1)/(wL_0 + rK_0)} - 1 \tag{3.15}$$

where w, and r are the wage rate and the reward for capital respectively. X_1, L_1, and K_1 are the current output, labour and capital respectively while X_0, L_0, and K_0 are the base value of all the variables. Solow's index of measuring TFP is based on Cobb-Douglas production assuming constant return to scale with autonomous and neutral technical change thus:

$$\frac{dA}{A} = \frac{dX}{X} - \left(\alpha \frac{dL}{L} + b \frac{dK}{K} \right) \tag{3.16}$$

$b = (1 - a)$

where *a* and *b* are the shares of labour and capital respectively while *dX*, *dL* and *dK* are the time derivative of *X*, *L* and *K*.

With the assumption of competition Kendrick equation (3.15) can be:

$$dA/A = \frac{X_1 / X_0}{a_0 \left(\frac{L_1}{L_0} \right) + b_0 \left(\frac{K_1}{K_0} \right)} - 1 \tag{3.16}$$

which is the same as Solow's measure of small changes in the quantities of inputs and output. Proper specification and estimation of parameters of the production function like *a* and *b* in (3.16) are essential to the measurement of TFP. Given the aggregate two-factor production function of the form:

$$X = AS(L, K) \tag{3.17}$$

where *A* is a measure of disembodied technical change. *S* is homogeneous, differentiating Equation (3.17) with respect to time and dividing by X gives:

$$\frac{dA}{A} = \frac{dX}{X} - \left(\frac{dLS_L}{X} * \frac{dL}{L} + \frac{dKS_K}{X} * \frac{dK}{K} \right) \tag{3.18}$$

where S_L and S_K are the partial derivative of output with respect to *L* and *K* and $\frac{dL}{L}$ $\frac{dK}{K}$ are the time derivatives of the variables. It can be deduced from equation (3.18) that the magnitude and stability of dA/A depends upon the specification of the production function that directs S_L and S_k, proper measurement of *L* and *K* and adjustment for their quality changes, and also important of other variables outside *K* and *L* that are left out of the production function.

Assuming production function is $= AL^{\alpha}K^{\beta}$, Equation (3.18) reduces to (3.16), if the share of labour is assumed to be time-invariant with respect to $^{dL}/_{L}$ and $^{dK}/_{K}$ and with constant return to scale (*b=1-a*). Any error due to misspecification would spill over to the measure of $^{dA}/_{A}$ which is the measure of 'our ignorance' (Hulten, 2001).

Following the approaches of Berument, *et al*. (2011), Herzer (2012) and Miller and Upadhyay (2000) the estimating Equation for TFP is derived thus:

$$TFP_{it} = \beta_0 + \delta_1 RLIB_{it} + \delta_2 FDI_{it} + \delta_3 DCPS_{it} + \delta_4 USTB_{it} + \delta_5 INSTI_{it} + \varepsilon_{it} \quad (3.19)$$

where *i* represents individual country of the selected SSA countries *i*=1, 2…..*N*, *t* is the time period which is *t* 1, 2….*T*. *RLIB* is the index of interest rate liberalization, *USTB* is the proxy for foreign interest rate *DCPS* is domestic credit to the private sector, *FDI* is foreign direct investment which is the main explanatory variable of interest for this model and *INSTI* is quality institution in the respective countries and ε_{it} signifies the usual error term. It must be mentioned here that the process of derivation of the TFP model would go through initial derivation of the production function as discussed previously. The residual from such estimation constitutes the variable for TFP for the present analysis. This follows the approaches of Berument, *et al*. (2011), Herzer (2012) and Miller and Upadhyay (2000).

In sum the entire models to be estimated for the present study are specified with each model answering objective questions one to five. Meanwhile objectives one and two are answered by model one:

$$MCAP_{it} = \alpha_i + \beta_1 RLIB_{it} + \beta_2 TRNV_{it} + \beta_3 DCPS_{it} + \beta_4 INSTI_{it} + \\ + \beta_5 RGDP_{it} + \varepsilon_{it} \quad (3.20)$$

$$MCAP_{it} = \phi_i + \varpi_1 SLIB_{it} + \varpi_2 DCPS_{it} + \varpi_3 USTB_{it} + \varpi_4 RGDP_{it} + \varepsilon_{it} \quad (3.21)$$

$$FDI_{it} = \kappa_i + \partial_1 RLIB_{it} + \partial_2 RGDP_{it} + \partial_3 INSTI_{it} + \partial_4 DCPS_{it} + \\ + \partial_5 USTB_{it} + \varepsilon_{it} \quad (3.22)$$

$$TFP_{it} = \beta_0 + \delta_1 RLIB_{it} + \delta_2 FDI_{it} + \delta_3 DCPS_{it} + \delta_4 USTB_{it} + \\ + \delta_5 INSTI_{it} + \varepsilon_{it} \quad (3.23)$$

For the present analysis model one which is Equation (3.20) is the first stock market development model answers the first and second research questions. Equation two (Equations 3.21) which is the second stock market development model answers the third research question. Equation (3.22) is the FDI inflows model which implements the fourth research question. The fourth and final model is the TFP model that answers the fifth research question. Stock market development model is split into two in order to observe individually the effect of interest rate liberalization and stock market liberalization on the development of stock market.

3.4 Justification of Variables

The variables are justified based on definitions, interpretations and measurement of each variables used in the equations. Justification also includes the use of these variables by past studies.

3.4.1 Definitions and Measurements of Variables

The section discusses the meaning and the measurement of individual variables used in the study as exemplified by past studies.

3.4.2 Market Capitalization

$Mcap$ is market capitalization is the market value of a company's outstanding shares. It measures the size of a particular stock exchange. It signifies the size of the stock market. It is one of the dependent variables of the present study. Market capitalization is measured by the number of listed securities scaled by the GDP, it is measured in percentage. Studies in the literature have used capitalization of the stock markets as proxy by number of securities scaled by GDP to measure the development of stock markets as the dependent variables in their analysis. These studies among others are: Calderon-Rossell (1990); El-Wassal (2005); and Yartey (2008).

3.4.3 Interest Rate Liberalization Index

$Rlib$ is an index computed for measuring the intensity of interest rate liberalization. Index numbers are used to compare the values of variables over different time. The interest rate liberalization index runs from the value of one to three and measures the intensity of liberalization of interest rates in different countries. The study adopts the chronology of Kaminsky & Schmukler (2008) henceforth K-S in computing this index. The different dates of liberalization of interest rates by the individual countries are obtainable from the International Monetary Fund's Annual Report on Exchange Arrangements and Exchange Restrictions IMF (AREAR).Values are assigned based on the policy of the country whether it is liberalizing or restricting interest rates. The legal code of the monetary authorities of the seven selected SSA countries on different interest rates policies and its liberalization can be obtained on line from the IMF AREAR.

According to the categorization by K-S, the criterion for full interest rate liberalization is when there is no control on both borrowing and lending rates. Here '3' point is awarded. For partial interest rate liberalization there are controls on either lending or borrowing interest rates. A value of '2' is awarded for partial liberalization. For no liberalization or full restriction, there are controls on both lending and borrowing rates, here '1' value is allotted for full restrictions or no liberalization.

3.4. 4 Stock Market Liberalization Index

Stock market liberalization index is computed in the same procedure as the interest rate liberalization index. Different dates of liberalization of the stock market by individual countries are obtained from the IMF AREAR. For full liberalization of stock market, foreigners are allowed to invest in domestic equity without restrictions. Dividends, interest, and capital can be repatriated within two years of initial investment. '3' points are allotted for full liberalization of stock market.

Partial liberalization of stock market entails that foreigners are allowed participation up to 49 per cent of domestic companies' equities. Restrictions for foreign participation in certain sectors might be imposed. There might be chances for indirect means of participation in stock market like country fund. Interest, capital and dividend can be repatriated not before two years and not after five years of initial investment. The point for partial liberalization is '2'. Absence of stock market liberalization is when there is full control where foreigners are not allowed to participate in the domestic equity markets. For full restriction, the value awarded is'1'. The chronology of K-S is widely used in the literature. An example is Brafu-

Insaidoo and Biekpe (2013) that examine the effect of liberalization on capital inflows in selected SSA countries. *Slib* variable has been previously use in estimating the effect of liberalizing the stock market on cost of capital and investment in the emerging economies by both Bekaert & Harvey (2000) and Henry (2000) respectively.

3.4.5 Stock Turnover Ratio

$TRNV$ represents the turnover ratio that measures the liquidity of the stock markets. $TRNV$ is the measure of stock market liquidity which is the ratio of stock value traded as a percentage of market capitalization and is measured in percentage ratio. The index measures the volume of trade regarding the whole stock exchange. Yartey and Adjasi, (2007) and Yartey (2010) use the turnover ratio to investigate the macroeconomic determinants of stock market in the emerging countries. Stock market liquidity has also been investigated by authors like Dermirguc-Kunt and Levine (1998) Yartey (2008) on the effect of stock market development.

3.4.6 Real Gross Domestic Product

$RGDP$ indicates the real Gross Domestic Product and it measures economic growth in the respective countries. $RGDP$ evaluates the monetary values of goods and services produced in a year using constant values, it is measured in millions of dollars. The influence of macroeconomic stability has been observed by different authors (Levine & Zervos, 1998; Yartey & Adjasi, 2007) through the use of such variables as real GDP and inflation. Brana and Lahet (2010) also include both

financial development indices and real GDP in the determination of inflows to some Asian countries.

3.4.7 Institutional Quality

$Insti$ is the index of institutional qualities that evaluates the different institutions governing the stock market development. For the present study, institutional quality is measured using the supervisory and regulatory framework and this is proxy by the rule of law. Institutional quality is measured by the political risk index computed by the International Country Risk Guide ICRG. Political risk consists of different components such as law and order, corruption and military in politics. In this analysis, focus would only be on law and order which measures the supervisory and regulatory framework. Maximum of 100 points is awarded for country with law and order. High value is awarded for low risk country, country with good quality institution while a lower value is awarded for country with poor quality institutions that is high risk country. Institutional quality is measured in points up to maximum of 100 points. This index is widely used in the literature (Meldrum, 2000; Yartey, 2004; 2008). Chinn and Ito (2006) and Klein (2005) investigate the effects of quality institutions on liberalization in some selected developing countries.

3.4.8 Domestic Credit to the Private sector

$Dcps$ is the domestic credit to the private sectors by banks. $Dcps$ is the domestic credit to the private sector as a percentage of GDP. It measures the extent of financial development in the selected SSA nations. This variable in combination with the indices of stock market development evaluates the degree of financial development of an economy. The variable is measured in percentage. Kagochi *et al*. (2013) use the

domestic credit to the private sectors as a percentage of GDP to proxy for financial development in study of growth and financial development of some SSA countries. For the purpose of the present study *DCPS* measures the extent to which the private sectors have access to funds. In evaluating stock market development, the influence of banks unit of financial development (as measured in *DCPS*) on stock market is also investigated.

3.4.9 Foreign Direct Investment

FDI is the value of foreign investment inflows. Foreign direct investments are the net inflows of the value of inward direct investment made by non- residents' investors in the reporting economies. It includes reinvested earnings and intra-company loans net of repatriation. It is also regarded as investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. *FDI* is the volume of foreign direct investment inflows to the domestic economy and is measured in millions of dollars.

3.4.10 Foreign Interest Rates

$USTB$ is the six months US treasury bills and is measured in percentage. This is the general proxy for foreign interest rate normally use in the literature. Furthermore the impact of foreign interest rate on capital inflow has been analyzed by Fernandez-Arias (1996). The author uses USTB to proxy for foreign interest rate. United States Treasury Bill (USTB) is used to proxy for foreign interest rates. This is because

USTB represents risk-free rate of return. A risk-free rate of return is the reward expected by investors for investing in the venture. Realistically however a risk free rate of return does not exist and the interest rates on three months USTB are often used to represent the risk-free rate.

3.4.11 Total Factor Productivity

Total factor productivity is the change in total output that is not attributed to the contribution of factor input. TFP is the rate of technical change and it is the residual from the estimation of the production function. Miller and Upadhyay (2000) investigate the influence of liberalization as one of the determining factors of TFP. In the same manner, Safdar Ullah (2005) observes the determinants of TFP in Pakistan using both FDI and human capital as part of the determining factors. The residual from the estimation of growth model represent the series for TFP for the present analysis.

3.4.12 Human Capital

$HCAP$ measures the level of education in terms of human capital development. It indicates the total enrollment in secondary school education expressed as a percentage of education and is measured in percentage. Asiedu (2004), (2006) investigates the determinants of FDI in some SSA countries using educational level to proxy for human capital.

3.4.13 Gross Fixed Capital

GFK is the Gross Fixed Capital formation that measures the capital stock. Capital stock is the stock of physical capital and for developing countries the marginal product of capital is expected to be high in the developing countries due to the dearth of capital in these countries. In their estimations of determinants of TFP, Collins and Bosworth (1996), Safdar Ullah (2005) and Miller and Upadhyay (2000) have all included capital stock, as proxy by gross capital formation. *GFK* is the gross fixed capital and measured in percentage.

3.4.14 Labour Force Total

The variable measures the number of employed persons in each country which include self-employed people. The series is derived from the data from World Indicators through International Labour Organization (ILO). The series represent labour that is part of the variable use in estimating the Cobb-Douglas production function. Labour turnover is also used to measure the total labour force in the countries. Lft is the total labour force and is also measured in percentage.

3.5 Justification of Variables by Model

The variables in the first model are: market capitalization as the dependent variable, interest rate liberalization index, turnover ratio, real GDP, institutional quality, domestic credit to the private sector and foreign interest rate. The index of interest rate liberalization and quality institution are justified in that they are the major explanatory variables of interest for this objective. Domestic credit to the private sector and turnover ratio are evaluating the level of financial development. The real GDP is measuring macroeconomic stability of the individual countries.

The second model has such variables as: FDI, interest rate liberalization, real GDP, institutional quality, school enrollment, domestic credit to the private sector, foreign interest rates. In this model the dependent variable is the foreign investment inflow which is proxy by FDI net inflows. The other variables are the explanatory variables that are observing their effects on FDI as done by past studies discussed previously. The essence of the explanatory variables in this second model is to observe the impact of interest liberalization, quality of institutions, foreign interest rate, and human capital development in either enhancing or discouraging foreign investment inflows to the selected SSA nations. The third model is the second stock market development model with stock market liberalization as the only variable differentiating this model from the first model. The only different is to observe the impact of liberalizing the stock market as differentiated from the impact of liberalizing the interest rate raised in the first model.

The fourth and the final model is the TFP model. TFP in this model is the dependent variable and the other variables of FDI, interest rate liberalization, foreign interest rate are all explanatory variables. In this model, the study observes whether FDI inflow and other explanatory variables are the determinants of technical change in the selected SSA countries.

3.6 Hypothesis on Relationships between the Dependent and Explanatory Variables

Development of the stock market which is the dependent variable is determined by various factors among which are income levels, quality institutions, financial liberalization, portfolio inflow, and stock market liquidity (El-Wassal, 2005; Yartey,

2008). Liberalization of interest rate is expected to have positive long run effect on stock market development. Interest rate liberalization also has significant impacts on the development of equity markets (Omole & Falokun, 1999). Stock market liberalization is expected to have positive long run effect on the stock market. Liberalizing the stock market has positive effects on investment level (Henry, 2000) and on the cost of capital (Bekaert & Harvey, 2000). The chances of financial liberalization leading to growth depend on the quality of institutions prevailing in the economy (Chinn & Ito, 2006). Studies (El-Wassal, 2005; Yartey, 2008) have established positive relationship between institutional qualities and stock market development. The expected relationship between stock market development and quality institution is therefore positive.

Interest rate liberalization is expected to have positive effect on FDI. Anyanwu (2011), Harrison (1995) and Shen *et al.* (2010) all find empirical evidences of the positive effects of liberalization on FDI. Countries that are naturally endowed in addition with political stability and less corruption are also having positive influence on foreign investment in the host economies (Asiedu, 2006). Foreign investment is expected to have positive significant influence on productivity change. De Mello (1999) finds positive relationship between FDI inflows and some OECD countries. Furthermore, Hung and Sun (2011) find positive effect of FDI on TFP in 29 provinces of China for the period 1980-2005. Interest rate liberalization is also expected to have a positive impact on productivity.

3.7 Data

The study uses secondary data. Secondary data are the ones that are already collated by different institutions. The sources of the data for the purpose of the present research are the International Monetary Fund (IMF), World Development Indicators (WDI). All these are obtained online. Data on institutional qualities is derived from International Country Risk Guide (ICRG) published by Political Risk Service (PRS) group. The data on stock market liberalizations and interest rate liberalization are derived from the legal code of the respective countries stating the different dates that the stock markets and interest rates are liberalized. The dates are published by the International Monetary Fund IMF's Annual Report on Exchange Arrangement and Exchange Restrictions (AREAR). The data covers the period 1990 to 2013. However, there is limitation of getting data for institutional qualities. There are some missing data on market capitalization and turnover ratios. Interpolation method is hereby used to fill in the missing years for the two variables. Data on foreign interest rate is obtained from Federal Reserve Board data base online.

3.8 Method of Analysis

The research uses panel data analysis. The benefits from using panel data analysis include: controlling for individual heterogeneity, some individual characteristics are not observed like willingness to take risk; they are described as unobserved heterogeneity. If these units influenced the variable of interest and are correlated with the observed variables, the estimated effects of the variables will be biased. Another important advantage of panel data analysis is on the dynamics of adjustment. Panel data analysis using different individuals in different periods avoid the need for

lengthy time series by exploiting information on the dynamic reactions of each of several individuals.

In particular, the present study employs heterogeneous dynamic panel data analysis. This is because there are some different features that are peculiar to some of the cross sectional units as such it would be appropriate to estimate them differently. According to Pesaran and Smith (1995), wrong assumption of slope homogeneity in an heterogeneous panel, would lead to the estimates of convergence to be affected by heterogeneity bias. The estimate coefficients of the lagged dependent variable would be biased upwards in a situation where commonality of the lagged dependent variable is wrongly imposed. In essence the estimates from such a wrong imposition of homogeneity would not be consistent.

Empirical results and evidences from the traditional panel data analysis where the intercepts and the parameters of the slopes are pooled together show that these parameters are not homogeneous and should not be lumped together. In this case the resulting estimates from such analysis may not be consistent if the slope coefficients and parameters are heterogeneous (Eberhardt & Bond, 2009). The new technique of Mean Group (MG) by Pesaran and Smith (1995) is recommended to take care of such heterogeneity in slopes. The MG assumes different intercepts slopes and short run variances and estimates separately for each group and computes the average for the individual units in the panel. The traditional fixed effects model assumes all the slopes, the long run coefficients and adjustment mechanism to be same while freeing only the intercepts to be different among the group.

Pooled Mean Group technique takes a middle position between the two by allowing the intercepts, slopes and error variances to be different while assuming similar long run coefficients among the individual panel member. Furthermore the MG estimator is also plagued with small sample bias when *T* is small. In this case the coefficient of the lagged value of the dependent variable is bias downwards and increasing the sample size does not resolve the problem since the whole estimates are biased in the same direction (Pesaran, Shin & Smith, 1997). Taking a middle position between these two extreme cases is the Pooled Mean Group (PMG) estimator. PMG assumes commonality among the long run coefficients while error variances, short run coefficients and intercepts are assume to be different among the panel members.

3.8.1 Panel Unit Root Test

Also the study establishes the extent of integration among the variables through the panel unit root test. Since it is generally known that the time series macro data are dominated by trend component. Situation where these variables move together, regression of such variables may lead to spurious regressions. Spurious regression is a situation where the estimated result of regression shows significant and the power of the coefficient of determination tend to be high whereas the results are not significant with low predictive power. When the number of observations is large, then there are variations in the data. The essence of unit root test is to determine the stationarity of the variables. The behavior of a stationary series is being strongly influenced by the stationarity in the series. This is because a shock or disturbance to the system with a stationary series will eventually die out.

In essence a shock to the system in time *t* will have less impact in time *t+1* and which would also have reduced impact in time *t+2* in that order. If however the data is non-stationary, the shock to the system would not die away naturally but would be persistent (Brooks, 2008). Another advantage of panel unit root is in the predictive power of the estimate results. Two different panel unit root tests are employed: Levin and Lin (LL) (2002) and Im, Pesaran and Shin (IPS) (1997) panel unit root tests to determine the stationarity of the variables before the estimation. The LL state that individual unit root tests are less powerful against alternative hypotheses with more persistent deviations from equilibrium. This is more pronounced in small samples. LL recommend performing a more powerful panel unit root test rather than individual unit root tests for each cross-sectional unit. The null hypothesis is that each individual cross-sectional unit has a unit root against the alternative hypotheses that individual time series is stationary. The Levin, Lin & Chu (LLC) (2002) test is pooled DF or ADF with different lag lengths across the cross-section units.

LLC model of panel unit root is presented in Equation (3.24)

$$\Delta Y_{i,t} = \alpha_i + \rho Y_{i,t-1} + \sum \varphi_k \Delta Y_{i,t-k} + \delta_{it} + \theta_t + u_{it} \qquad (3.24)$$

the model allows for two-way fixed effects of unit-specific fixed effects and unit specific time trend a_i measures the unit specific fixed effect while θ_t measures the time specific effect. From the perspective of the present analysis, Equation (3.24) indicates that α_i represents the individual country's effect, such as the specific effect from Botswana, Cote d'Ivoire…South Africa. $\rho Y_{i,t-1}$ signifies both the coefficients and the lagged values of the dependent variables of *MCAP*, *FDI* and *TFP*. θ_t is the

time specific fixed effect which represents 1990 to 2013 for individual countries in the panel.

For the present analysis *Y* represents a set of variables such as:

$$MCAP_{it} = \alpha_i + \beta_1 RLIB_{it} + \beta_2 TRNV_{it} + \beta_3 DCPS_{it} + \beta_4 INSTI_{it} + \\ + \beta_5 RGDP_{it} + \varepsilon_{it} \quad (3.25)$$

The coefficients of Y_i is restricted among the units in the panel, that is individual units in the panel are restricted to have common coefficients thus:

$Ho: \rho = 0$ (each time series in the panel has unit root).

$H_a: \rho < 0$ (each time series is stationary).

That is it assumes similarity of p among all the units in the panel. In estimating the LLC, the method requires that the number of lags used in each cross-section ADF regression (p_i) be specified. The LLC also assumes that the individual processes are *iid* that is identically independent. Moreover, the exogenous variables used in the equations must be specified. The choice is either to include individual constant terms (fixed effects), or to employ constants and trends (Baltagi, 2005).

Furthermore, the study employs panel unit root test of Im, Pesaran & Shin (IPS) (1997). The technique is appealing because it allows individual heterogeneity among the panel members. Hence it takes care of serial correlation problem by allowing heterogeneity among the individual units in the group. The method models the

Augmented Dickey-Fuller regression with the individual fixed effects and a time trend for each unit thus:

$$\Delta y_{it} = \alpha_i + \rho_i y_{i,t-1} + \sum_{j=1}^{\rho_i} \varpi_{ij} \Delta y_{i,t-j} + \varepsilon_{it}; \quad i = 1,2,.....N \; ; \quad t = 1,2,.....T \qquad (3.26)$$

where y_{it} represents the variables in individual country i and t year period, α_i signifies the individual fixed effects ρ is chosen to prevent the correlation of the residuals over time. The null hypotheses is $\rho_i = 0$ for all i and the alternative hypotheses is $\rho_i < 0$ for some *i=1, 2,....N* and $p_i = 0$ for $i = N_{1+1,.....,}N$

The statistics is based on deriving the mean value of the individual ADF unit root tests (t_i) thus:

$$t_{IPS} = \frac{\sqrt{N}(\bar{t} - E[t_i \mid p_i = 0])}{\sqrt{\text{var}(t_i \mid p_i = 0)}} \rightarrow N(0,1) \qquad (3.27)$$

where $\bar{t}$ $\bar{t} = N^{-1} \sum_{i=1}^{N} t_i$ The moments of $E(t_i \mid p_i - 0)$ and $\text{var}(t_i \mid p_i = 0)$`are obtained by Monte Carlo simulation.

3.8.2 Panel Cointegration Test

In order to establish a long-run relationship between the dependent and independent variables in the study, the research will employ two types of cointgration tests: Pedroni (2001) panel cointegration and Fisher cointegration test.

3.8.3 Pedroni Cointegration Test

The study conducts Perdoni's test to determine the direction of cointegration among the variables in the study where multiple regressors among the cointegrating vectors are allowed. An advantage of Pedroni's method over Kao is that Pedroni's test allows for different regressors for the cointegrating vectors to change among different units of the panel. It also allows for heterogeneity in the errors among the individual panel member in the group. The panel model proposed by Pedroni is:

$$Y_{it} = \alpha_i + \delta_i t + \beta_{1i} x1_{it} + \beta_{2i} x_{2i,t} + ... + \beta_{Mi} x_{Mi,t} + e_{i,t} \quad (3.28)$$

for $t = 1, ..., T;\ i = 1, ...N;\ m = 1, ...M$

where t refers to the number of observations over time, N refers to the number of individual units in the panel while m is the number of regression variables. The slope coefficient which is the β's are allowed to vary among individual panel members. The parameter a_i is the member specific intercept which is allowed to vary among individuals $\delta_i t$ represents deterministic time trend that are specific to individual and are allowed to change.

From the perspective of the present analysis, t refers to the number of years such as *1990, 1991…2013*. N refers to the seven number of countries being investigated such Botswana, Cote d'Ivoire, Ghana Kenya, Mauritius, Nigeria and South Africa as mentioned previously and m is the number of explanatory variables such as: $RLIB$, $RGDP$, $INSTI$, $DCPS$, $TRNV$ and $USTB$.

Seven different cointegrating statistics are proposed to capture the within (pooled) and between (group mean) effects categorized into two. Out of the seven statistics, four are based on the within dimension (time series) while three are based on the between dimension. The procedure for estimating the null of no cointegration: analysts estimate the residual error from the cointegrating regression from a multivariate panel regression. In conducting the test, intercept and slope are allowed to be different. The next step is to use the result from the panel regression to estimate using different test statistics.

The within dimension statistics are estimated by adding the denominator and the numerator terms over the *N* dimension separately. The between-dimension statistics are estimated by initial division of the numerator by the denominator and then adding over the *N* dimension (Law, Tan & Azman-Saini, 2015; Pedroni, 1999). The within estimators are based on such method that pool the autoregressive coefficients across individual cross section unit for the unit root test on the estimated residuals. The between dimension are based on the procedure that find the overall average of the individual units.

Test of null of no cointegration for the within dimension is H_0:$\gamma_i = 1$ for all *i*, versus alternative hypotheses H_i: γ_i=$\gamma < 1$ for all *i*.

If the null of no cointegration is not significant, then the null is rejected. The tests statistics of Pedroni is presented thus:

The panel *v* statistic

$$T^2 N^{3/2} Z_{\bar{v}NT} = \frac{T^2 N^{3/2}}{(\sum_{i=1}^{N}\sum_{t=1}^{N} \widehat{L}_{11i}^{-2}\widehat{u}_{it}^2)} \tag{3.29}$$

Panel *p* statistic

$$T\sqrt{NZ_{\tilde{p}NT}} = \frac{T\sqrt{N}(\sum_{i-1}^{N}\sum_{t=1}^{T} \widehat{L}_{11i}^{-2}(\widehat{u}_{it-1}^2 \Delta\widehat{u}_{it}^2 - \widehat{\lambda}_i))}{(\sum_{i=1}^{N}\sum_{t=1}^{T} \widehat{L}_{11i}^{-2}\widehat{u}_{it}^2)} \tag{3.30}$$

The (non-parametric) panel *t* statistic

$$Z_{tNT} = \sqrt{\tilde{\sigma}_{NT}^2 \sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2}\hat{u}_{it-1}^2}\left(\sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2}(\hat{u}_{it-1}^2 \Delta\hat{u}_{it}^2 - \hat{\gamma}_i)\right) \tag{3.31}$$

The (parametric) panel *t* statistic

$$Z_{tNT} = \sqrt{\tilde{\sigma}_{NT}^{*2} \sum_{i-1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2}\hat{u}_{it-1}^{*2}}\left(\sum_{i=1}^{N}\sum_{t-1}^{T} \hat{L}_{11i}^{-2}(\hat{u}_{it-1}^{*2} \Delta\hat{u}_{it}^{*2} - \hat{\gamma}_i)\right) \tag{3.32}$$

The next category is the three tests of the between dimension which is based on pooling of the data. They include:

The group (parametric) *p* statistics

$$T\sqrt{N}\overline{Z}_{\bar{p}NT} = T\sqrt{N}\frac{\sum_{t=1}^{T}(\widehat{u}_{t-1}^2 \Delta\widehat{u}_{it}^2 - \widehat{\lambda}_i)}{\sum_{i-1}^{N}(\sum_{t=1}^{T}\widehat{u}_{it-1}^2)} \tag{3.33}$$

the (non-parametric) panel *t* statistic:

$$\sqrt{N}\widetilde{Z}_{tNT-1}^{*} = \sqrt{N}\sum_{i-1}^{N}\left(\sqrt{\widetilde{s}_i^2 \sum_{t=1}^{T}\hat{u}_{it-1}^2}\right)\sum_{t=1}^{T}(\hat{u}_{it-1}^2 \Delta\hat{u}_{it}^2 - \hat{\gamma}_i) \tag{3.34}$$

The group (parametric) *t* statistics is:

$$\sqrt{N}\tilde{Z}^{*}_{tNT-1} = \sqrt{N}\sum_{i=1}^{N}\left(\sqrt{\tilde{s}_i^{*2}\sum_{t=1}^{T}\hat{u}^{*2}_{it-1}}\right)\sum_{t=1}^{T}(\hat{u}^{*2}_{it-1}\Delta\hat{u}^{*2}_{it}) \tag{3.35}$$

Pedroni cointegration test is being employed for FDI inflow model while Fisher cointegration test would be used for determining the cointegration of the variables for the remaining models.

3.8.4 Fisher Cointegration Test

Fisher test is applied in determining the cointegration of the variables in the first, third and fourth models. One of the advantages of Fisher test is that it introduces cross sectional dependence among the variables. Cross-sectional dependent is a situation where there is a common shock among the units in the panel. An example of common shock in this case is the 2007/2008 World crises. Another merit of Fisher test is that the limiting distribution is normal. Also the estimation can be done with predetermined cointegrating vectors without affecting the asymptotic null disturbances (Westerlund, 2008). Past literatures on cointegration dumped the use of this technique because the results indicate null of no cointegration. However Westerlund clamor for a new approach that takes cognizance of the panel data structure in order to increase the power of test.

The theoretical foundation of Fisher cointegration test as developed by Larsson, Lyhagen and Lothgren (2001) is thus presented:

$$\Delta Y_{it} = \Psi_i Y_{i,t-1} + \sum_{k=1}^{k_{i-1}} \Gamma_{ik}\Delta Y_{i,t-k} + \varepsilon_{it} \tag{3.36}$$

i=1, 2.....N

where *k* is the number of lags, ε_{it} is the error term that are not correlated among the units $\Psi_{ik} = \sigma_i \delta_i^{'}, \sigma_i$ is a *p x v* matrix of adjustment coefficients, $\delta_i^{'}$ is a *p x v* matrix of cointegrating relations for country *i*.

The hypothesis is that all members *N* in the panel have at most *v* cointegrating relationship among the *p* variables. The rank hypothesis is thus presented:

$H_0 : rank(\Psi_i) = v_i \leq v$ for all *i= 1,...N*

H $H_i : rank(\Psi_i) = p$ for all *i=1……N*

The trace statistic for each unit *i* in the panel is :

$$LR_{iT}\{H(v) \mid H(p)\} = -2\ln X_{iT}\{H(v)H(p)\} \tag{3.37}$$

where $H(v) : rank(\Psi) \leq v, H(p) : rank(\Psi) = p$

the asymptotic distribution of the trace statistics is

$-2\ln X_{iT}\{H(v) \mid H(p)\} \xrightarrow{w} Z_{k,}$

$$Z_k \equiv tr\left\{\int_0^1 (dW)W^{'}(\int_0^1 WW^{'})^{-1}\int_0^1 W(dW)^{'}\right\} \tag{3.38}$$

W is $k = (p - v)$ after finding the mean of *N* individual trace statistics it becomes

$$\overline{LM}_{NT}\{H(v) \mid H(p)\} = \frac{1}{N}\sum_{i=1}^{N} LM_{iT}\{H(v) \mid H(p)\} \tag{3.39}$$

The LM- bar statistics is proposed as a basis for the panel cointegration rank test that is

$$Y_{\overline{LM}}\{H(v) \mid H(p)\} = \frac{\sqrt{}(\overline{LM}_{NT}\{H(v) \mid H(p)\} - E(Z_K))}{\sqrt{\text{var}(Z_k)}} \tag{3.40}$$

where $E(Z_k)$ is the mean and $\text{var}(Z_k)$ is the variance of the asymptotic trace statistic

For the null hypotheses $H_0 : rank(\Psi_i) = v_i \leq v$ for all *i=1,.....,N,* the normal panel trace statistics $Y_{\overline{LM}} \Rightarrow N(0,1)$ as N and T $\rightarrow \infty$ such that $\sqrt{NT^{-1}} \rightarrow 0$.

The step begins with *v=0*. If the hypotheses is rejected, the next step is to test *v=1*. The procedure continues until the null is no longer rejected or the hypotheses of *v=p-1* is rejected.

3.9 Macro Dynamic Panel Data Analysis

It is customary for panel data analysis to assume that some of the parameters are the same across the panel that is when panel estimation is generalized. However the reality of dynamism in macro data negates this assumption. When pooling assumption does not hold, panel is referred to as heterogeneous panel (since some parameters actually vary across the panel). Macro dynamic panel data is a situation where the number of *T* is larger than cross-section that is (*T >N*) or where both *T* and *N* are equally large. This technique is applicable to the present study of seven SSA countries (*N*) is less than (*T*) for 24 years period. The Pooled Mean Group (PMG) proposed by Pesaran, Shin & Smith (1999) is the means of resolving the bias caused by heterogeneous slopes in dynamic panel. The parameters of interests according to Pesaran *et al*. (1999) are both the long-run coefficients and the coefficients of speed of adjustment.

3.9.1 Derivation of the TFP Model

Reference is made to sub-sections 3.3.4 and 3.3.5 on the process of deriving the TFP model through the production function. The first section which is the production function logged the Cobb Douglas production function and estimate. The residual of this estimation constitute the series for the TFP model and it is adopting the

approaches of Berument *et al*. (2011), Herzer (2012) and Miller and Upadhyay (2000). It is based on the parametric growth accounting approach of estimating the TFP and efficiency is automatically assumed here.

3.9.2 Mean Group Estimator

Part of the assumptions of the MG estimators is the requirement that the group specific parameters are distributed independently of the regressors and these regressors are strictly exogenous. It also does not take account of the fact that certain parameters may be the same across groups. The procedure for the MG is less restrictive. It allows for heterogeneity of all the parameters. The method derives the long-run parameters for the panel from an average of the long-run parameters from Autoregressive Distributed Lag (ARDL) model for individual countries. The MG estimator estimates separate regressions for each country and computing averages of the country-specific which will provide consistent estimates of the long-run coefficients. The estimates of the β's, the long-run coefficients for the group are estimated individually and the average value among countries is calculated.

The resulting estimates are taken as the mean value for the entire group. The problem with this type of computation is that in a situation of small sample, where *T* is small the MG estimator does not yield efficient result (Hassan, Azali & Lee, 2014). Regarding the selected SSA countries the unrestricted short-run coefficients and slopes among the selected SSA economies allow the dynamic specification to differ among countries. However, South Africa is the outlier among the selected SSA nations because it is more developed economically going by statistics, hence using

simple average to represent the group of six may not be the true reflection of individual characteristics.

Given that the ARDL is the following:

$$Y_{i,t} = \alpha_i + \gamma_i Y_{i,t-1} + \beta_i X_{i,t} + u_{i,t} \quad (3.41)$$

For country *i*, where $i = 1,2,.....N$ and $t=1,2.....T$

the long-run parameter θ_i for country *i* is:

$\theta_i = \frac{\beta_i}{1-\gamma_i}$ and the MG estimators for the whole panel would be:

$$\widehat{\theta} = \frac{1}{N}\sum_{i=1}^{N}\theta_I \quad (3.42)$$

$$\widehat{\alpha} = \frac{1}{N}\sum_{i-1}^{N}\alpha_i \quad (3.43)$$

In this specification *N* represents the seven SSA countries and *T* is the 24 years' time period of investigation. The MG technique would be used to estimate the TFP model.

3.9.3 Dynamic Fixed-Effects

This is a situation where the individual specific effects like country or firm can be controlled. The Dynamic fixed-effects estimator imposes restrictions on all slope coefficients allowing only the intercepts to vary among the countries. This method is in sharp contrast to the MG which allows variations on all the parameters including

short and long-run estimates, error variances. The traditional fixed effects model assume that individual fixed effect is correlated with all the explanatory variables and the model are so estimated. However in a dynamic set up where the number of individual in the units tend to become larger while the time period is fixed, the fixed effects estimator become inefficient (Nickell, 1981) The practice in the dynamic fixed effects model is to constrain the coefficients of the lagged value of the dependent variables as well as the slopes to be same among the panel members. This method according to Pesaran and Smith (1995) would lead to inefficient estimates of these coefficients where there is heterogeneity among the units in the panel. The use of instrumental variables to resolve the problem of the inconsistency would not eliminate this bias (Weinhold, 1999). In a typical fixed effect model of the form:

$$y_{it} = \alpha_i + \partial y_{it-1} + \phi x_{it} + \varepsilon_{it} \qquad (3.44)$$

Imposition of similarity in the lagged dependent variable ∂ among the cross-sectional units induces bias and inconsistency in estimation of the coefficients (Pesaran & Smith, 1995; Weinhold, 1999).

3.9.4 Pooled Mean Group (PMG)

The dynamic fixed-effects estimator allows similarity of all slope coefficients through the restriction of the $(N-1)\,(2K+2)$ restrictions on the unconstrained model of Equation (3.45) : that is N intercepts, k long run coefficients, k short run coefficients in addition to the coefficient of lagged dependent variable and common variance. On the other hand the MG allows separate estimation of the model while computing the average of the individual effects. Hence for the MG, the parameters to be estimated are: $N(2k+3)$ with each equations having $2k$ coefficients of the explanatory variables, one intercept, one lagged dependent variable coefficient and a

variance. PMG imposes restrictions $(N-1)k$ on the unconstrained model since there is only one long run coefficient for individual *k* exogenous regressors. The PMG estimator as introduced by Pesaran *et al.* (1999) allows the intercepts, short-run coefficients and error variances to differ freely across groups, but allows the long-run coefficients to be the same among groups. This is based on the fact that long-run equilibrium relationships between dependent and independent variables are similar for group of countries among regions.

Also is the fact that common technologies characterized all the members in the group in a similar manner. It is based on a combination of pooling and averaging of coefficients provided the data allows estimating the model as a system. Assumption of common long run coefficients does not translate to the fact that these coefficients would converge to unity (Pesaran *et al.,* 1997). The appeal of the PMG estimator is the fact that it allows for common long run among the selected SSA countries considering the fact that they are all low income developing countries (with the exception of South Africa). At the same time the periods of adjustments back to long run equilibrium after the shock to the system differ among these countries. The advantage of PMG among other estimators is that the technique allows for heterogeneity through the different adjustment mechanisms for the units while still exhibiting the common long run traits among the units in the panel.

The unrestricted specification for the ARDL system of equations for *t*= 1,2,….*T*, time periods and *i = 1,2,…N* countries for the dependent variable *Y* is:

$$Y_{it} = \sum_{j=1}^{p} \lambda_{ij} y_{i,t-j} + \sum_{j=i}^{q} \gamma_{ij}^{'} X_{i,t-j} + u_i + \varepsilon_{it} \qquad (3.45)$$

where $X_{i,t-j}$ is the (*K x1*) vector of explanatory variables for group i and u_i represents fixed effect $y_{i,t-j}$ is the lagged dependent variable and for the present analysis is proxy by *MCAP* and *FDI*. λ_{ij} represents the scalar coefficient of the lagged value of the dependent variable, also γ'_{ij} represents the vector coefficient of the lagged value of the explanatory variable. The model can be reparameterized as a Vector Error Correction Model (VECM) system:

$$\Delta y_{iy} = \theta_i \left(Y_{i,t-1} - \beta_i^{'} X_{i,t-1}\right) + \sum_{j=1}^{p-1} \vartheta_{ij}^{'} \Delta Y_{i,t-j} + \sum_{j=1}^{q-1} \gamma_{ij}^{'} \Delta X_{i,t-j} + u_i + \varepsilon_{it} \qquad (3.46)$$

The terms in the bracket are the error correction terms which measure deviation from long-run equilibrium between the dependent and independent variables. θ_i is the coefficient of error correction terms measuring the speed of adjustment back to equilibrium. $\beta_i s$ reflect the restricted long-run parameters that are assumed to be similar for all the countries in the group. Practical example of this is that the selected seven SSA countries are assumed to have the same level of economic development, referred to as developing countries according to World Bank categorization. The model assumes that $\theta_i < 0$ for all i, a long-run relationship between dependent variable y_{it} and the independent variable X_{it} is denoted by:

$y_{it} = \delta'_i X_{it} + \varphi_{it}$, i=1, 2,…,N: t=1, 2,…..,T

where $\delta'_i = -\beta'_i / \theta_i$ is the k x1 vector of the long-run coefficients and φ_{it} is the stationary process.

The PMG estimation has the advantage of being able to determine both long and short-run dynamic relationships. This approach may be more relevant to the selected SSA countries with identical history of political upheavals and most especially the

same levels of economic developments. The similarity in the levels of economic developments justifies the homogeneity of long-run coefficients among the selected group of SSA countries. Another advantage of the PMG technique is that individual countries are expected to have different adjustment mechanisms. While the assumption of similar long run coefficients may be plausible, similarity in the adjustment coefficients is not realistic considering the different peculiarities of each member country. Thus the unrealistic assumption of common adjustment mechanisms among the units nullifies the use of dynamic fixed effects.

The robustness of the PMG technique would be done by presenting the estimations of both the DFE and the MG of the same estimated equation along with the PMG. The technique has been used by different authors in the literature. Bangake and Eggoh (2012) use the PMG technique in the analysis of mobility of capital in African countries. Bassanini and Scarpetta (2001) adopt the PMG approach in investigating the influence of human capital on growth in OECD countries. Result suggests positive influence of human capital on growth.

The PMG estimation is based on the assumption that the short -run coefficients, intercepts and error variances are allowed to vary across individual cross- section unit, but the long-run coefficients are assumed to be homogeneous. The group-specific short-run coefficients and the long-run coefficients are computed by the pooled maximum likelihood estimation. All the short run dynamics and the adjustment terms can vary easily (Pesaran *et al*., 1999).

3.9.5 Specification of Stock Market Model 1

The long run stock market development model which is represented by Equation 3.47 is specified thus:

$$MCAP_{it} = \psi_i + \delta_1 RLIB_{it} + \delta_2 TRNV_{it} + \delta_3 DCPS_{it} + \delta_4 INSTI_{it} + \\ + \delta_5 RGDP_{it} + \varepsilon_{it} \quad (3.47)$$

In the present analysis, it is assumed that each of the variables are *I(1)* and are cointegrated making their error terms to be *I(0)*, hence the ARDL specifications relating to Equation (3.47) is:

$$MCAP_{it} = \alpha_i + \beta_{10i} RLIB_{it} + \beta_{11i} RLIB_{i,t-1} + \beta_{20i} TRNV_{it} + \beta_{21i} TRNV_{i,t-1} + \\ + \beta_{30i} DCPS_{it} + + \beta_{31i} DCPS_{i,t-1} + \beta_{40i} INSTI_{it} + \beta_{41i} INSTI_{i,t-1} + \beta_{50i} RGDP_{it} + \\ + \beta_{51i} RGDP_{i,t-1} + \lambda_i MCAP_{i,t-1} + \varepsilon_{it} \quad (3.48)$$

The error correction specification of Equation (3.48) is:

$$\Delta MCAP_{it} = \phi_i (MCAP_{i,t-1} - \ell_{0i} - \ell_{1i} RLIB_{it} - \ell_{2i} TRNV_{it} - \ell_{3i} DCPS_{it} - \\ - \ell_{4i} INSTI_{it} - \ell_{5i} RGDP_{it}) - \beta_{10i} \Delta RLIB_{it} - \beta_{20i} \Delta TRNV_{it} - \beta_{30i} \Delta DCPS_{it} - \\ - \beta_{40i} \Delta INSTI_{it} - \beta_{50i} \Delta RGDP_{it} + \varepsilon_{it} \quad (3.49)$$

where $\ell_{0i} = \frac{\alpha_i}{1-\lambda_i}, \ell_{1i} = \frac{\beta_{10i} + \beta_{11i}}{1-\lambda_i}, \ell_{2i} = \frac{\beta_{20i} + \beta_{21i}}{1-\lambda_i}, \ell_{3i} = \frac{\beta_{30i} + \beta_{31i}}{1-\lambda_i},$
$\ell_{4i} = \frac{\beta_{40i} + \beta_{41i}}{1-\lambda_i}, \ell_{5i} = \frac{\beta_{50i} + \beta_{51i}}{1-\lambda_i}, \phi_i = \lambda_i - 1$

where $MCAP_{it}$ represent the dependent variables, *i* represent the individual countries in the group that is *i=1,2……7* and *t* is the number of years, and shows *t=1990, 1991….2013*. Variables on the right hand side are the respective explanatory variables for the group of the seven selected SSA countries as explained in previous discussion. ϕ_i is the coefficient of error correction that measures the speed of

adjustment of the independent variables back to equilibrium. In order to establish a long run relationship between stock market development as proxy by $MCAP_{it}$ and interest rate liberalization $RLIB_{it}$ in the selected seven SSA nations, then the adjustment coefficient ϕ_i must not be zero $\phi_i \neq 0$. The coefficients of long run which are restricted among the group in the panel are $\ell's$.

The major focus of this technique of estimation is in the speed of adjustment mechanism and the common long-run relationship. The impact of heterogeneity of the means of the parameters can be investigated through Hausman-type test. Hausman (1978) proposed test for the difference between the MG and PMG estimators. If the coefficients are homogenous, the PMG techniques are more efficient than the MG. The null hypothesis is that: the difference in the estimated coefficients between the MG and PMG are not significantly different, in that case PMG is more efficient.

3.9.6 Specification of Stock Market Model 2

The long run stock market development model is specified as:

$$MCAP_{it} = \upsilon_i + \varphi_1 SLIB_{it} + \varphi_2 DCPS_{it} + \varphi_3 USTB_{it} + \varphi_4 RGDP_{it} + \varepsilon_{it} \quad (3.50)$$

Based on the simplifying assumption that the individual variables are *I(1)* and cointegrated, it is expected that the error terms u_{it} are stationary *I(0)* for all the countries. The ARDL Equation is thus specified:

$$MCAP_{it} = \varpi_i + \nu_{10i} SLIB_{it} + \nu_{11i} SLIB_{i,t-1} + \nu_{20i} DCPS_{it} + \nu_{21i} DCPS_{i,t-1} + \\ + \nu_{30i} USTB_{it} + \nu_{31i} USTB_{i,t-1} + \nu_{40i} RGDP_{it} + \nu_{41i} RGDP_{i,t-1} + \\ + \gamma_i MCAP_{i,t-1} + \varepsilon_{it} \quad (3.51)$$

Given the ARDL specification of Equation (3.51), the error correction Equation is thus:

$$\Delta MCAP_{it} = \vartheta_i (MCAP_{i,t-1} - \psi_{0i} - \psi_{1i} SLIB_{it} - \psi_{2i} DCPS_{it} - \\ - \psi_{3i} USTB_{it} - \psi_{4i} RGDP_{it}) - \nu_{10i} \Delta SLIB_{it} - \nu_{20i} \Delta DCPS_{IT} - \\ - \nu_{30i} \Delta USTB_{it} - \nu_{40i} \Delta RGDP_{it} + \varepsilon_{it} \quad (3.52)$$

where $\psi_{0i} = \frac{\varpi_i}{1-\lambda_i}, \psi_{1i} = \frac{\nu_{10i} + \nu_{11i}}{1-\lambda_i}, \psi_{2i} = \frac{\nu_{20i} + \nu_{21i}}{1-\lambda_i}, \psi_{3i} = \frac{\nu_{30i} + \nu_{31i}}{1-\lambda_i},$

$\psi_{4i} = \frac{\nu_{40i} + \nu_{41i}}{1-\lambda_i}, \vartheta_i = \lambda_i - 1$

where $t=1,2,\ldots\ldots T$, $i=1, 2,\ldots\ldots N$. T represents the number of years while N is the number of countries in the group. The definitions of variables are as specified in the previous discussion. For the present model, ϑ_i measures the adjustment mechanism which must not be zero for us to establish a long run relationship between stock market development and liberalization of stock market in the seven selected SSA economies. The long run coefficients that are assumed to be same among the countries are signified by $\psi_i^{'}s$.

3.9.7 Specification of Model 3 (FDI Inflow Model)

The long run FDI model is thus presented:

$$FDI_{it} = \vartheta_i + \gamma_1 RLIB_{it} + \gamma_2 RGDP_{it} + \gamma_3 INSTI_{it} + \gamma_4 DCPS_{it} + \\ + \gamma_5 USTB_{it} + \varepsilon_{it} \quad (3.53)$$

The ARDL specification of Equation (3.53) is:

$$FDI_{it} = \kappa_i + \partial_{10i} RLIB_{it} + \partial_{11i} RLIB_{i,t-1} + \partial_{20i} RGDP_{it} + \partial_{21i} RGDP_{i,t-1} + \\ + \partial_{30i} DCPS_{it} + \partial_{31i} DCPS_{i,t-1} + \partial_{40i} USTB_{it} + \partial_{41i} USTB_{i,t-1} + \\ + \partial_{50i} INSTI_{it} + \partial_{51i} INSTI_{i,t-1} + \beta_i FDI_{i,t-1} + \varepsilon_{it} \quad (3.54)$$

Given the ARDL specification of equation (3.54), the assumption is that individual variables in (equation 3.53) are *I(1)* and cointegrated thus their error are stationary. The error correction model for equation (3.54) is:

$$\Delta FDI_{it} = \theta_i (FDI_{i,t-1} - \omega_{0i} - \omega_{1i} RLIB_{it} - \omega_{2i} RGDP_{it} - \omega_{3i} DCPS_{it} - \\ - \omega_{4i} USTB_{it} - \omega_{5i} INSTI_{it}) - \partial_{10i} \Delta RLIB_{it} - \partial_{20i} \Delta RGDP_{it} - \partial_{30i} \Delta DCPS_{it} - \quad (3.55) \\ - \partial_{40i} \Delta USTB_{it} - \partial_{50i} \Delta INSTI_{it} + \varepsilon_{it}$$

where $\omega_{0i} = \frac{\kappa_i}{1-\lambda_i}, \omega_{1i} = \frac{\partial_{10i} + \partial_{11i}}{1-\lambda_i}, \omega_{2i} = \frac{\partial_{20i} + \partial_{21i}}{1-\lambda_i}, \omega_{3i} = \frac{\partial_{30i} + \partial_{31i}}{1-\lambda_i},$

$\omega_{4i} = \frac{\partial_{40i} + \partial_{41i}}{1-\lambda_i}, \omega = \frac{\partial_{50i} + \partial_{51i}}{1-\lambda_i}, \theta_i = \lambda_i - 1$

where *t=1,2,……T, i=1, 2,…..N*. *T* represents the number of years while *N* is the number of countries in the group. The definitions of variables are as specified in the previous discussion. θ_i is the error correction mechanism while the $\omega_i^{'}s$ are the coefficients of long run that are assumed to be similar among the group members. In order to establish a long run relationship between FDI and interest rate liberalization, the speed of adjustment θ_i must not be zero.

3.9.8 Specification of Model 4 (Total Factor Productivity Model)

The TFP model for the present analysis is derived using the MG estimating technique of (Pesaran & Smith, 1995). The estimating MG model is thus presented:

$$\widehat{\varphi}MG = N^{-1}\sum_{i-1}^{N}\widehat{\varphi}_{i,} \quad \widehat{\nu}MG = N^{-1}\sum_{i=1}^{N}\widehat{\nu}_{i} \tag{3.56}$$

$$TFP_{it} = \beta_0 + \delta_1 RLIB_{it} + \delta_2 USTB_{it} + \delta_3 DCPS_{it} + \delta_4 FDI_{it} + \delta_5 INSTI_{it} + \varepsilon_{it} \tag{3.57}$$

Unlike the previous models the estimating technique for TFP model is the MG of Pesaran and Smith (1995) where the average values are used to represent the value for individual panel member. This approach assumes heterogeneity of slopes, short and long run coefficients among the group in the panel.

3.10 Conclusion

The study uses three different existing models to form estimating Equations for the different objectives for the present study. The models of El-Wassal (2005) and Yartey (2008) are employed for the stock market model. Also the existing model of Asiedu (2006) is used for the FDI inflow model. The models of Berument *et al*. (2011), Hezer (2012) and Miller and Upadhyay (2000) are employed for the TFP model. The methods of analysis for the models of study are both the Pesaran *et al.* (1999) and Pearan and Smith (1995) technique of estimating bias of heterogeneity in panel data. PMG technique is used to analyze the models of stock market development and the FDI inflow models while the MG method is used to estimate the TFP model.

CHAPTER FOUR

DISCUSSION OF RESULTS

4.1 Introduction

The chapter begins with the descriptive analysis and correlation of the variables. This would be followed by examining the stationarity of the variables to guide against spurious regression. Panel cointegration of the variables is done based on each model to examine the long run relationship among the variables in each model. The estimation of the models and discussion follow the panel cointegration results. The estimating techniques are the PMG technique of Pesaran *et al.* (1999) and MG method of Pesaran and Smith (1995).

4.2 Descriptive Statistics

The descriptive statistics table is presented in Table 4.1. Standard deviation is one of the means of measuring volatility (Dermirguc-Kunt & Levine, 1998). The overall standard deviation for two of the dependent variables of *MCAP* and *FDI* are relatively high compared to that of the *TFP* that has a moderate disparity. The standard deviations of these variables represent the dispersion of the variables along its mean value. From another perspective it measures the volatility of the variables *MCAP*, *FDI* and *TFP*. The standard deviation of the RGDP is also high which indicates the extent of dispersion of this variable around the average value. Another noticeable fact about the overall series for the seven SSA countries is the average real income per capita ($2542) which is low compared to Latin America and the Caribbean with ($5510). This drives home the fact that the average citizen of the

SSA region are poor compared with their counterpart in other parts of the world. Furthermore, regarding the main independent variables of interest, (*RLIB* and *SLIB*) the standard deviation is generally low among all the countries of interest which is below one. The implication of low standard deviation of both indices is that the values are not widely dispersed along its mean. Institutional qualities also have low standard deviation among the countries since it is a little higher than one.

Table 4.1
Descriptive Statistics for the Variables among the Countries

Variables	Mean	Standard Dev.	Minimum	Maximum	Observation
DCPS	30.89	23.71	3.66	108.1	168
RGDP	5.61	8.33	3.22	3.24	168
GFK	19.06	6.99	5.46	35.92	168
LFT	1.22	1.32	44.4	5.42	168
INSTI	10.26	1.15	7.22	11.96	168
USTB	3.26	2.18	0.09	7.46	168
HCAP	55.14	24.67	14.82	110.8	168
RLIB	2.15	0.72	1	3	168
FDI	1.14	2.10	-2.87	9.89	168
TFP	23.82	1.12	21.82	25.78	168
INFL	11.60	11.38	-0.81	72.84	168
MCAP	42.22	56.09	0.99	278.4	168
TRNV	9.13	13.39	-2.85	64.26	168
DIR	10.66	6.27	2.43	35.76	168
SLIB	2.18	0.73	1	3	168
RGDPP	2542.0	2240	376.6	6930.8	168

NOTE: DCPS= domestic credit to the private sector scaled by the GDP; FDI= foreign direct investment; GFK=gross fixed capital formation; LFT =total labour force; MCAP= market capitalization as a percentage of GDP; RGDP= real gross domestic product; RGDPP= real gross domestic product per capita; TRNV= stock market turnover which measures liquidity of the stock market; SLIB= stock market liberalization index; RLIB= interest rate liberalization index; INSTI= institutional quality; USTB= 6 months' United State' Treasury bill representing foreign interest rate; HCAP= school enrolment measuring human capital; TFP=total factor productivity; INFL=inflation or the price level; DIR=deposit interest rate.

4.3 Correlation Analysis

The degree of correlations among the variables is done on the basis of different objectives which are differently modelled. The two stock market models are

combined for the correlation analysis purpose while the other objectives are separately modelled.

4.3.1 Correlation Analysis of Stock Market Models

Table 4.2 presents the correlation among the variables for the stock market model. The strength of the correlation between the dependent variable of *MCAP* and the other explanatory variables like *RGDP, TRNV* is high. It however has negative low correlation with foreign interest rate supporting the theory behind the liberalization that foreigners are attracted to investing in the domestic economies of the SSA conditioned upon low foreign interest rates in their countries of origin (Fernandiz-Arias, 1996). *USTB* has negative and low correlations with all the other variables apart from itself which implies that the relationship with these other variables and foreign interest rates are either low or non-existence. The capitalization of stocks is highly correlated with the domestic credit to the private sector. This implies that the existence of financial development is one of the essential ingredients for stock market development (Yartey, 2008). The extent of correlation between market capitalization and the two liberalization indices is around average.

Table 4.2
Correlations of Variables in the Stock Market Development Model

	MCAP	RLIB	SLIB	DCPS	RGDP	INSTI	TRNV	USTB
MCAP	1.00							
RLIB	0.41	1.00						
SLIB	0.46	0.86	1.00					
DCPS	0.70	0.24	0.34	1.00				
RGDP	0.83	0.47	0.48	0.47	1.00			
INSTI	0.03	0.22	0.20	0.02	0.02	1.00		
TRNV	0.80	0.45	0.44	0.53	0.86	0.03	1.00	
USTB	-0.08	-0.54	-0.54	-0.19	-0.14	-0.28	-0.19	1.00

4.3 .2 Correlation Analysis of FDI Inflows Model

Foreign investment model has a high correlation with the *RGDP*, a moderate correlation with *RLIB* and a low correlation with *INSTI*. Surprisingly the correlation of *FDI* with the *DCPS* is low indicating that DCPS may not be a major driver of foreign investment inflows. The degree of correlation between the *FDI* and *USTB* is both low and negative thus corroborating the postulations of determinants of *FDI* as discussed previously. Low interest rate in the industrial countries is one of the factors pushing foreigners to invest in the developing countries (Fernandiz-Arias, 1996).

Table 4.3
Correlations of Variables in the FDI Model

	FDI	**RLIB**	**DCPS**	**RGDP**	**INSTI**	**USTB**
FDI	1.00					
RLIB	0.50	1.00				
DCPS	0.18	0.24	1.00			
RGDP	0.68	0.47	0.47	1.00		
INSTI	0.03	0.22	0.02	0.02	1.00	
USTB	-0.32	-0.56	-0.19	-0.14	-0.28	1.00

4.3.3 Results of Correlations of Variables in the TFP Model

The TFP as the dependent variable in this model has perfect correlation with itself and a fairly high correlation with the *FDI*. This indicates that there is a strong relationship between technical change and *FDI*. Expectedly the degree of correlation between the *TFP* and *USTB* is low and negative. This implies that foreign interest rate does not determine the ability of the developing countries to successfully imitate the technology of the advanced countries. It is also validating the theoretical postulations that low foreign interest rate will boost *FDI* as well as improve

productivity. The extent of the relationship between *TFP* and *INSTI* is low lending credence to the poor institutions in the countries of SSA.

Table 4.4
Correlations of Variables in the TFP Model

	TFP	DCPS	FDI	RLIB	INSTI	RGDP	USTB
TFP	1.00						
DCPS	-0.25	1.00					
FDI	0.48	0.18	1.00				
RLIB	0.25	0.24	0.50	1.00			
INSTI	0.03	0.02	0.04	0.22	1.00		
RGDP	0.52	0.47	0.68	0.47	0.02	1.00	
USTB	-0.09	-0.19	-0.32	-0.56	-0.28	-0.14	1.00

4.4 Panel Unit Root

The results of the panel unit root test using two different methods of LLC and IPS for both level and first difference are depicted in Table 4.5. The approach is in conformity with Bangake and Eggoh (2011). The merits of the two techniques of panel unit root tests have been discussed in chapter three. Variables such as *INSTI, MCAP, GFK, USTB, LFT, INFL* and *SLIB* exhibit stationarity at level using the method of LLC. Table 4.5 reveals that for these variables the null hypothesis of no unit root cannot be rejected at one per cent significant level using the method of LLC and IPS. Furthermore, using the methods of IPS and LLC variables such as *INSTI, INFL* and *USTB* are stationary at one per cent significant level. Virtually all the variables are stationary at one per cent level of significant after first difference using the two techniques as depicted in columns (2 & 3) and (4 & 5) of Table 4.5. More of the variables are stationary at level using the method of LLC than using the IPS technique.

Table 4.5
Estimated Results of Panel Unit Root tests

Variables	Im, Pesaran & Shin		Levin, Lin & Chu	
	Level	1st Difference	Level	1st Difference
DCPS	-0.63	-4.66***	-1.25	-4.97***
FDI	-1.20	-6.17***	-0.56	-3.54***
GFK	-1.32	-6.31***	-2.79***	-6.39***
INFL	-3.35***	-7.89***	-4.18***	-7.37***
INSTI	-6.36***	-0.73	-4.26***	5.49
RLIB	-0.11	-	-1.74**	-
LFT	1.19	0.96	1.18	0.38
MCAP	-1.24	-5.84***	-2.58***	-6.54***
RGDP	3.59	-3.66***	1.38	-5.05***
HCAP	2.88	-0.01	1.67	-0.16
SLIB	0.15	-	0.45	-
TRNV	-1.32	-5.26***	-0.84	-4.91***
TFP	0.52	-5.73***	-0.49	-6.45***
USTB	-7.77***	-6.23***	-3.14***	-6.84***

NOTE: *** and ** indicate significant at one and five per cent level respectively, * shows significant at ten per cent.

4.4 Panel Cointegration

Two different types of cointegration tests are employed for the present analysis: Pedroni and Fisher cointegration tests. The essence of this is to explore both the heterogenous and the homogenous relationships among the cross sectional units. While Pedroni assumes homogenous relationship among the cross sectional units, Fisher imposes assumption of heterogeneity among the units in the panel. Pedroni cointegration is employed for the second model, while Fisher cointegration is employed for the first, third and fourth models.

4.4.1 Cointegration Results of Stock Market Model 1

Result of the cointegration test of Table 4.6 for the first model using Fisher cointegration reveals that there is at least one cointegrating vector among the variables for the selected countries. It shows that there exist a long run relationship between the stock market development and the liberalization of

interest rates in the countries under investigation. Both trace tests and maximum-eigenvalue show that there are at most four cointegrating vectors among the countries selected. This translates to the fact that using the Fisher test of cointegration, for the first stock market development model, the null of no cointegration can be rejected and there exists a long run relationship among the variables in model 1.

Table 4.6
Fisher Cointegration Results for Stock Market Development Model 1

Hypothesized No. of CE (s)	**Fisher Stat (Trace test)**	**Probability**	**Fisher Stat (Max-EigenTest)**	**Probability**
None	493.7	0.000***	409.2	0.000***
At most 1	216.9	0.000***	120.4	0.000***
At most 2	113.7	0.000***	70.6	0.000***
At most3	54.2	0.000***	39.2	0.000***
At most 4	26.6	0.022	15.5	0.347
At most 5	22.9	0.061	22.9	0.061

NOTE: *** and ** represent one and five per cent significant levels respectively

4.4.2 Cointegration Results for Model 3 (FDI Inflow Model)

Pedroni system of cointegration is adopted for the second (FDI) model. Out of the seven different categories of measuring cointegration four are significant. The two within dimensions that are significant are panel pp-statistics and panel ADF-statistics. The two between dimensions that are significant are Group pp-statistics and Group ADF-statistics. Panel v-Statistics, panel rho-Statistics from the within dimensions and Group rho-Statistics from the between dimensions' results are not significantly different from zero. On this basis it can be concluded that using the Pedroni's approach, the variables of the FDI model are cointegrated among the seven selected SSA countries. Table 4.7 shows the

results. For the FDI inflow model and using the Pedroni cointegration test the null of no cointegration can be rejected in most of the countries under investigation.

Table 4.7
Pedroni ' Cointegration Results for Model 3(FDI Inflow Model)

	Statistics	**Probability**
Panel v-Statistics	-0.68	0.75
Panel rho-Statistics	1.13	0.87
Panel pp-statistics	-24.90	0.00***
Panel ADF	-6.33	0.00***
Group rho-Statistics	1.85	0.97
GroupPP –statistics	-18.64	0.00***
Group ADF-Statistics	-4.04	0.00***

NOTE: ** indicates five percent level of significant and * is significant at ten percent

4.4.3 Cointegration Results for Stock Market Model 2

Fisher cointegration test is employed for the second stock market model. The model investigates the influence of stock market liberalization on development of the stock market. Results indicate that for both trace statistics and maximum Eigen value there are at most one cointegrating vectors among the variables in the selected SSA countries. This implies that there exist long run relationships among the variables. Therefore for the Fisher tests of this model, the null of no long run relationship among the variables can be rejected for at most two of the variables. This result is depicted in Table 4.8.

Table 4.8
Fisher Cointegration Results for Stock Market Development Model 2

Hypothesized No. of CE(s)	**Fisher Stat. (Trace test)**	**Probability**	**Fisher Stat. (max-Eigen test)**	**Probability**
None	171.5	0.000***	132.7	0.000***
At most 1	61.10	0.000***	49.24	0.000***
At most 2	23.84	0.048**	12.99	0.528
At most 3	18.15	0.200	15.82	0.324
At most 4	11.70	0.631	11.70	0.631

NOTE: ** and * are significant levels at five percent and ten percent respectively.

4.4.4 Cointegrating Results for TFP Model

The cointegration among the variables in the TFP model is analysed with the Fisher cointegrating methods. The result as indicated in Table 4.9 suggests that using both the trace statistics and maximum Eigen value, we cannot accept the null of no cointegration among the countries of interest. In essence the null of no cointegration can be rejected for at most four of the variables for this model implying that the model of TFP is cointegrated.

Table 4.9
Fisher Cointegration Results of TFP Model

Hypothesized No of CE(s)	Fisher Stat. (Trace Test)	Probability	Fisher Stat. (Max-Eigen Test)	Probability
None	437.6	0.000***	335.7	0.000***
At most 1	222.1	0.000***	123.6	0.000***
At most 2	116.6	0.000***	65.0	0.000***
At most 3	62.8	0.000***	37.6	0.001***
At most4	35.9	0.001***	29.3	0.009**
At most 5	18.3	0.192	18.3	0.192

NOTE: ** and * are significant levels at five and ten percent respectively.

4 .5 Estimates Result of PMG for Stock Market Model 1

The result reveals that on average, liberalizing the interest rates in the seven selected SSA countries by one per cent would reduce the stock market

development by two per cent in the long run. This is in conformity with Demetriades and Devereux (1992) that use panel data for 63 developing countries for the period 1961-1990. Result shows negative effect between interest liberalization and investment. It however contradicts the findings of Omole and Falokun (1999) on the linkage between interest rates, debt-equity ratio and profitability among selected firms in Nigeria. The fact remains however that interest rates are costs to the investors. Different types of investors both foreign and domestic need to borrow from the financial markets in order to fulfil their investment objectives. Borrowing from the financial markets at liberalized interest rates translates to higher costs to the foreign investors since liberalized interest rates are relatively high.

The empirical findings also negate the theoretical postulations of liberalization. Liberalizing the interest rate does not enhance the development of the stock market as postulated by the neo-liberalists. Furthermore, the effect of 2007 to 2009 financial crises has some devastating impacts on the economies of the SSA region. The negative effect of interest rate liberalization on the development of the stock market may be a reflection of the bad impacts of 2007 to 2009 world financial crises. The estimation of this stock market model also implements the second objective for this study which is the influence of institutional quality on the development of stock market. On average, improving the quality of institution by one per cent will enhance the development of the stock market by 3.3 per cent in the long run for the selected SSA nations. Increase in institutional quality instils confidence in both the local and foreign investors who invest

more in the stock market thereby boosting the development of the stock market. The results are presented in Table 4.10.

Table 4.10
Results of PMG Estimator for the 1st Stock Market Development Model

Dep. Var. lMcap				
Variable	Coefficients	Standard Error	t-statistics	p>|z|
lRLIB	-2.00	0.28	-7.03	0.00***
lTRNV	0.40	0.12	3.42	0.00***
lDCPS	-0.78	0.39	-1.98	0.05**
lINSTI	3.28	0.44	7.49	0.00***
lRGDP	2.79	0.43	6.57	0.00***
CONS.	-23.21	6.77	-3.43	0.00***
Short run(ec)	-0.35	0.10	-3.41	0.00***

NOTE:***, ** and * indicate significant levels at one, five and ten per cent respectively.

Empirical support on institutional qualities is found in Yartey (2008) who discovers that improved quality institutions in 42 emerging economies have positive effect on the development of stock market. Moreover the result on quality institution is supported by theoretical postulations on financial development. The theory states that the effectiveness of any financial market is consequent upon the existence of strong quality institutions such as entrenchment of property rights, enforcement of law and order among others. Stock market liquidity as measured in turnover ratio is also significant with the expected sign. One per cent increase in stock market liquidity will enhance the development of the stock market by 0.4 per cent in the long run for the seven selected SSA nations. This is result is corroborated by Balogun, Dahalan & Hassan (2016a) that investigates the relationship between stock market liquidity and stock market development in the selected SSA countries. The finding

indicates that stock market liquidity has a positive long run effect on the development of stock market.

The RGDP is also having a positive long run relationship with the development of the stock market. One per cent increase in the level of real GDP would increase the stock market development by 2.8 per cent in the long run for the selected SSA countries. Increase in RGDP signifies increase in economic growth. Increase in growth implies that the financial sector of the economy is also growing. Stock market is a subset of the financial sector. The result is confirmed by El-Wassal (2005) and Yartey and Adjasi (2007) both papers find positive influence between economic growth and stock market development in the SSA region. The finding on the domestic credit to the private sector is also significant but however negative. One percent increase in the level of domestic credit to the private sector will reduce the development of the stock market by 0.8 percent. This is contrary to apriori expectation. It might be the exhibiting of the low levels of the financial development in the SSA countries. It implies that the private sector in the SSA is not getting the necessary financial assistance both from the governments. The more the financial assistance to the private sector the more it would invest in the stock market.

4.6 Robustness of Stock Market Model 1

The robustness of the PMG estimator among other estimators is shown through the presentation of the three techniques in Table 4.11. The table shows three different methods of estimations DFE, MG and PMG. The PMG result is more

favourable where the variable of interest (*RLIB*) is significant at 5 per cent significant level. Also all the explanatory variables are significant with the correct sign except *DCPS*.

Table 4.11
Robustness of PMG Estimator for the Stock Market Development Model 1

Dep. Var. lMcap	**DFE**	**MG**	**PMG**
Variables	Coeff.	Coeff.	Coeff.
lTrnv	0.04	0.35	0.40***
	(0.31)	(1.11)	(3.42)
lRlib	-0.34	-0.17	-2.00***
	(-0.80)	(-0.27)	(-7.03)
ldcps	-0.60	-0.08	-0.78**
	(-1.64)	(-0.34)	(-1.98)
linsti	1.86**	3.05	3.28***
	(2.20)	(1.58)	(7.49)
lrgdp	1.35**	1.26***	2.79***
	(2.53)	(2.96)	(6.75)
Cons.	-11.93	-23.54	-23.21
	(-2.48)	(-3.40)	(-3.43)
Short run (ec)	-0.38***	-0.75***	-0.35***
	(-5.86)	(-7.55)	(-3.41)

Values in parentheses are t- statistics, ** and * are five and ten percent significant levels respectively.

The interpretation of the adjustment period is that for the PMG, 38 percent of the distortion from long run equilibrium would be restored within the year. Using the MG estimator 75 percent of the shock to the system would be restored within the year. For the DFE 35 percent of the deviation from long run equilibrium would be restored within one year. The robustness of the PMG over DFE and MG is that different adjustment mechanism is allowed for individual country within the group. It is plausible to assume that individual countries within the panel have the same long run such as level of technology or the same level of economic development. It is however unrealistic to assume that

different countries have the same adjustment periods. Results of individual country's PMG estimates are presented in Table 4.12.

4.7 Individual Countries Results for the Stock Market Model 1

The individual country's results as presented in Table 4.12 show that six out of the seven countries have significant error correction mechanism leaving only South Africa out. The essence of presenting the individual countries results is to be able to see the separate adjustment mechanism of the respective countries. The interpretation of this is that since the error correction term is significant for the six countries, then long run relationship between interest rate and stock market development exist only in these six countries. For South Africa long run relationship between interest rate and stock market development cannot be established because of the insignificant adjustment mechanism for this country. Furthermore interest rate liberalization has positive significant influence on the development of stock market in both Kenya and Mauritius as exhibited by the significant of the index of interest liberalization in the two countries.

Moreover, this technique is able to determine different adjustment mechanism periods between the dependent variable and the explanatory variables for individual country. Individual countries have different adjustment periods as shown in Table 4.12. In Botswana 0.09 percent of the deviation from long run equilibrium of the explanatory variables from the dependent variable would be restored within the year. For Cote d'Ivoire 0.15 percent of shock to the system would be corrected within the year. Ghana would correct 0.43 percent of shock

to the system within one year. For Kenya, 0.85 percent of deviation from long run equilibrium of the independent variables from the dependent variable would be corrected within the year. In Nigeria about 0.26 percent of the shock to the system would be corrected within the year.

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Table 4.12
Individual Countries Estimates Results of the Stock Market Model1 using PMG Estimator

Dep. Var. lMcap	**BTW**	**CIV**	**GHA**	**KEN**	**MART**	**NIG**	**SAF**
Variable	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
lTRNV	-0.10	0.02	0.01	0.12	-0.01	0.20	-0.08
	(-0.71)	(0.25)	(0.05)	(1.05)	(-0.14)	(1.33)	(-0.35)
lRLIB	0.05	0.53	0.11	0.75**	0.93***	0.07	0.08
	(0.16)	(1.35)	(0.15)	(2.27)	(2.90)	(0.13)	(0.12)
lDCPS	0.89*	1.16*	-0.67	-0.37	-0.58	0.63**	-0.38
	(1.89)	(1.77)	(-0.80)	(-0.82)	(-0.90)	(2.41)	(-0.53)
lINSTI	-0.52	-0.53	-0.92	-2.25***	-2.03**	-2.03*	-1.61**
	(-0.70)	(-0.86)	(-0.32)	(-3.29)	(-2.63)	(-1.82)	(-1.99)
lRGDP	0.19	1.56	-8.29*	4.45**	-0.41	-0.56	-2.52
	(0.15	(1.34)	(-1.71)	(1.99)	(-0.15)	(-0.43)	(-0.79)
CONS	-6.04	-10.12	-28.45	-57.54	-31.15	-19.01	-10.15
	(-1.88)	(-2.21)	(-3.21)	(-6.16)	(-3.81)	(-2.64)	(-1.49)
Short run (ec)	-0.09**	-0.15**	-0.43***	-0.85***	-0.50***	-0.26**	-0.14
	(-1.97)	(-2.35)	(-3.47)	(-6.31)	(-4.34)	(-2.52)	(-1.52)

Values in the parentheses are t-statistics, ** and * indicates significant levels at five and ten per cent respectively.

4.8 Estimates Results of FDI Inflows model

Empirical findings from the estimates result of the FDI inflows model suggest that based on average; there is a long run relationship between the interest rate liberalization and foreign investment inflows in the selected SSA countries. Result on the FDI inflow model is depicted in Table 4.13. The PMG result shows that liberalizing the interest rates will improve the inflow of FDI in the long run. In essence on average, one per cent increase in interest rate

liberalization index would increase the level of FDI inflows by 2.1 per cent in the long run for the selected SSA economies. The sign of the *USTB* is contrary to the literature which portend that low level of foreign interest rate in the industrial countries is one of the factors 'pushing' inflows to the developing countries. Result in Table 4.13 has vitiated this assertion and it shows that appetite for risk on the part of the foreign investors and financial liberalization (among other factors) are responsible for FDI inflows to the selected SSA countries (Brana & Lahet, 2010; Shen *et al.*, 2010).

Shen *et al.* (2010) finds that financial liberalization is a salient factor in driving FDI inflows to developing countries. Furthermore, Brana and Lahet (2010) portends that appetite for risk on the part of foreign investors is one of the factors attracting capital inflows to developing countries. Result on domestic credit to the private sector is negative contrary to theoretical expectation. This may be exhibiting the fact that the region of SSA have grossly underdeveloped financial sector as corroborated by Kagochi *et al.* (2013) among others. Institutional bottlenecks in form of corruption, weak supervisory and regulatory framework and financial repression all contribute to low financial development in the region of SSA. The result is in conformity with Brafu-Insaidoo and Biekpe (2013) that investigates the effect of liberalization on FDI inflows in some 13 SSA nations.

Table 4.13
Estimate Results of PMG for FDI Model

Dep Var. lFDI				
Variable	Coefficients	Standard Error	t-statistics	p>|z|
lRLIB	2.13	0.44	4.86	0.00***
lRGDP	2.30	0.70	3.27	0.00***
lDCPS	-0.68	0.29	-2.32	0.02**
lUSTB	0.29	0.06	5.05	0.00***
lINSTI	1.87	0.84	2.24	0.03**
CONS.	-21.21	4.57	-4.64	0.00***
Short run (ec)	-0.52	0.11	-4.89	0.00***

NOTE: **, and * indicate significant levels at five and ten per cent respectively.

Furthermore, Shen *et al.* (2010) finds that liberalization strengthens the positive effect of capital inflow on growth in a panel data for 80 countries. The result also conforms to theoretical expectation of liberalization. The M-S postulates that liberalization of interest rate would attract the necessary capital inflows to the developing countries. Moreover, on average, improving the supervisory and regulatory framework by one percent will enhance the FDI inflows of the selected SSA economies by 1.9 percent in the long run. The error correction is highly significant with the appropriate sign.

4.9 Robustness of PMG Estimates for FDI Model

The method of PMG among other technique indicates a better result than the remaining two as presented in Table 4.14. This is because the coefficients of all the explanatory variables are significant at one and five per cent level of significance. It implies that on average there is a long run relationship between the FDI inflows and the interest rate liberalization and other explanatory variables.

Table 4.14
Robustness of PMG Estimator for FDI inflows Model

Dep. Var. lFDI	**DFE**	**MG**	**PMG**
Variables	Coeff.	Coeff.	Coeff.
lRLIB	-0.29	2.08	2.13***
	(-0.43)	(1.40)	(4.86)
lRGDP	3.98	4.53	2.30**
	(4.15)	(1.37)	(3.27)
lDCPS	-0.41	-2.44	-0.67**
	(-0.74)	(-0.72)	(-2.32)
lUSTB	0.09	0.12	0.29***
	(0.66)	(1.18)	(5.05)
lINSTI	2.12	3.03	1.87**
	(1.55)	(1.63)	(2.24)
CONS.	-50.97	-72.29	-21.21
	(-3.36)	(1.40)	(-4.64)
Short run (ec)	-0.64***	-0.92***	-0.52***
	(-7.90)	(-5.45)	(-4.89)

Values in parentheses are t-statistics ** and * represent significant levels at five and ten percent respectively.

The adjustment mechanism is significant and appropriately signed. This is also true for the other two techniques of DFE and MG. Using the DFE, 0.64 percent of the shock to the system would be restored within one year. For MG technique 0.92 percent of the disequilibrium would be rectified within the year and for the PMG estimator the 0.52 percent of deviation from long run equilibrium would be restored within the year. Establishing the robustness of the PMG in comparison to DFE is the fact that PMG estimates different speed of adjustments for individual countries within the panel and this is presented in Table 4.15. This is more plausible than the assumption of similar adjustment periods as in the fixed effect estimation.

4.10 Estimates of Individual Countries PMG Results for FDI Inflows Model

The result of individual countries 'estimates as presented in Table 4.15 shows that in six out of the seven countries there are long run relationship between the liberalization of interest rates and the foreign investment inflows. The six countries are: Botswana, Cote d'Ivoire, Ghana, Kenya, Mauritius and South Africa. These six countries have different values of adjustment mechanisms which are negative and significant. Nigeria is the only country among the seven with though negative but insignificant adjustment mechanism. The implication of this is that there is no long run relationship between foreign investment and interest rate liberalization in Nigeria while it exists in the remaining six countries.

The results for the six countries are in accord with postulations of liberalization theory as discussed previously in Section 4.12. The different adjustment periods for the individual countries are presented in the Table 4.15. In Botswana 0.54 percent of shock to the system would be rectified within one year. In Cote d'Ivoire the statistics is 0.73 percent. For Ghana, 0.28 percent of the shock to the system would be restored within the year. Kenya is 0.92 percent; Mauritius the statistics is 0.36 while for South Africa 0.72 percent of the disequilibrium would be restored within the year.

Table 4.15
Results of Individual Countries for FDI Inflow Model using PMG Estimator

Dep.Var. lFDI	**BTSW**	**CIV**	**GHA**	**KEN**	**MART**	**NIG**	**SAF**
Variables	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
lRLIB	-	-0.09	-0.40	1.08	-0.81	-0.91	-3.60
		(-0.26)	(0.49	(0.61)	(-0.69)	(-1.61)	(-1.18)
lRGDP	4.04	0.67	8.62	-4.99	-3.37	-1.33	40.98**
	(0.74)	(0.57)	(1.40)	(-0.48)	(-0.32)	(-1.12)	(2.11)
lDCPS	-1.19	1.41***	-0.19	-3.05	-1.58	-0.17	2.89
	(-0.60)	(2.98)	(-0.26)	(-1.14)	(-0.65)	(-0.86)	(0.83)
lUSTB	-0.36	0.03	0.03	-0.38	-0.11	0.03	-1.36**
	(-0.98)	(0.45)	(0.13)	(-0.94)	(-0.30)	(0.31)	(-1.97)
lINSTI	-1.03	-1.58*	-0.06	-1.37	2.11	1.05	-5.06
	(-0.22)	(-1.80)	(-0.04)	(-0.48)	(0.93)	(1.20)	(-1.28)
CONS.	-21.04	-28.96	-11.05	-36.94	-13.18	-4.69	-32.63
	(-1.59)	(-1.92)	(-1.42)	(-2.12)	(-1.41)	(-1.24)	(-2.00)
Shortr-run(ec)	-0.54**	-0.73***	-0.28*	-0.92***	-0.36**	-0.12	-0.72***
	(-2.21)	(-4.95)	(-1.84)	(-4.35)	(-2.23)	(-1.44)	(-4.05)

Values in the parentheses are t-statistics ** and * indicates significant level at five and ten percent respectively.

4.11 Estimates Results of Stock Market Model 2

The second stock market development model which is the second model for the present analysis is investigating the influence of stock market liberalization on the development of stock market itself. This objective is modelled separately from the first objective in order to see the separate influences of the two explanatory variables on the development of the stock market. The result indicates that on average, liberalizing the stock market will have a positive long run effect on the development of the stock market in the seven selected SSA countries.

The coefficient of stock market liberalization is statistically significant at five per cent level of significant. The result suggests that one per cent increase in the

index of stock market liberalization would lead to 6.6 percent increase in the development of the stock market for the selected SSA countries. It is in conformity with El-Wassal (2005) that examines the impact of liberalization on the development of the stock market in 40 emerging countries. Finding is also in tandem with Henry (2000) who investigates the effects of stock market liberalization on the costs of capital for 12 emerging market economies. Moreover the result conforms to theoretical postulation of financial liberalization. M-S portend that liberalizing the financial market would lead to development of the financial market and growth.

The findings on domestic credit to the private sector and the real GDP also show positive significant impact on the development of the stock market. The coefficients of both domestic credit to the private sector and real GDP are statistically significant at five and ten per cent levels of significant respectively. The implication of positive significant effect of domestic credit to the private sector is that banking sector unit of financial development influences the stock market. It means that the banking sectors are able to complement the stock markets in financing the domestic industries. Hence there is positive relationship between banks and stock market both of which measure financial development. The estimate of foreign interest rate is however contrary to theoretical expectation. One of the determinants of capital inflow in the literature on inflow is low foreign interest rate. When foreign interest rate is low, investors in the industrial countries look for other avenues where they can earn better reward to invest their funds. The investors in the industrial countries find it profitable to

invest in developing countries stock markets. This tends to increase the flow of funds to the developing countries where the returns are higher. The low interest rate in the industrial countries is one of the factors pushing capital inflow to developing countries (Fernandez-Arias, 1996). The explanation that can be given is that the investors 'appetite for risk (Brana & Lahet, 2010) goes beyond the foreign interest attraction for capital inflow.

Table 4.16
Estimate Results of Stock Market Development Model 2

Dep. Var. lMCAP				
Variable	Coefficients	Standard Error	t-statistics	p>|z|
lSLIB	6.56	2.57	2.55	0.01**
lDCPS	12.58	4.79	2.63	0.01**
lUSTB	3.62	0.97	3.73	0.00***
lRGDP	13.47	7.92	1.70	0.09*
CONS.	-5.11	2.09	-2.44	0.02**
Short run (ec)	-0.01	0.01	-2.62	0.01**

NOTE** and * indicate significant at five and ten percent respectively.

4.12 Robustness of the PMG Estimation of Stock Market Model 2

The robustness of the PMG estimator is presented in 4.18.The results of adjustment mechanisms for the three techniques PMG, MG and DFE are significant and appropriately signed. PMG estimator reveals that all the explanatory variables are statistically significant at five and ten per cent level of significant exhibiting the robustness of the PMG estimator among the other estimators. The foreign interest rate is significant though positive. This may be the consequent of the performance of SSA stock markets in recent years. The performances of the SSA stock markets are outstanding as measured in turnover

ratio and market sizes during the period 1995 to 2005 (Adjasi & Biekpe, 2006; Allen *et al.,* 2011; Yartey & Adjasi 2007).

Table 4.17
Robustness of PMG Estimator for Stock Market Development Model 2

Dep. Var. lMCAP	**DFE**	**MG**	**PMG**
Variables	Coeff.	Coeff.	Coeff.
lSLIB	-18.98	-7.27	6.56**
	(-1.05)	(-1.20)	(2.55)
lDCPS	-55.13*	-60.41*	12.58***
	(-1.75)	(-1.91)	(2.63)
lUSTB	-4.09	2.49	3.62***
	(-0.57)	(0.42)	(3.73)
lRGDP	56.01	95.47*	13.47*
	(1.13)	(1.75)	(1.70)
CONS.	-5.51	-21.43**	-13.98*
	(-0.93)	(-2.35)	(-1.89)
Short run (ec)	-0.01	-0.03***	-0.04***
	(-3.27)	(-3.74)	(-5.46)

NOTE: Values in parentheses are t-statistics, ** and * are five and ten percent significant levels respectively.

The outstanding stock market performances might outweigh the increase in the foreign interest rates to such extent that investors tend to prefer the large gain in investment in SSA stock markets to investing at home. This coupled with the fact that some investors may also want to explore new areas for investment in SSA economies might have led to a contagious factor that make foreigners to invest in the SSA nations irrespective of economic condition in their home countries. Furthermore the investors' appetite for risk and financial liberalization embarked upon by most SSA countries may be one of the factors behind the 'pulling' of inflows to the selected SSA region (Brana & Lahet, 2010).

4.13 Individual Countries Estimates of Stock Market Model 2

The individual countries results are derived based on separate adjustment mechanisms for different economies as shown in Table 4.18. The results indicate that four (Botswana, Mauritius, Nigeria and South Africa) out of the seven countries under investigation have significant speed of adjustment. For the remaining three countries (Cote d'Ivoire, Ghana and Kenya), the coefficients of error correction terms are not significant. This implies that there are no long run relationship between stock market development and the liberalization of the stock markets in these countries.

Table 4.18
Individual Countries Results of Stock Market Development Model 2

Dep.Var. lMcap	**BTSW**	**CIV**	**GHA**	**KEN**	**MART**	**NIG**	**SAF**
Variables	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
lSLIB	-0.27*	0.13	0.09	-0.11	0.06	0.19	0.05
	(1.92)	(0.92)	(0.19)	(-0.50)	(0.32)	(0.76)	(0.22)
lDCPS	0.25	0.41	-0.77	-1.62**	0.33	0.44*	-0.38
	(0.76)	(1.14)	(-0.92)	(--1.99	(0.42)	(1.83)	(-0.52)
lUSTB	-0.24**	0.21**	0.27	0.13	0.01	0.23*	-0.03
	(-2.55)	(2.32)	(0.98)	(0.83)	(0.14)	(1.83)	(-0.19)
lRGDP	1.80*	1.29	-10.1	-2.85	-1.88	-0.38	5.55
	(1.68)	(1.11)	(-1.49)	(-0.73)	(-0.58)	(-0.32)	(1.55)
CONS.	-13.9	-0.76	-3.05	-0.75	-3.96	-11.9	-1.24
	(-1.89)	(-0.46)	(-0.69)	(-0.21)	(-1.53)	(-1.77)	(-1.26)
Short run(ec)	-0.04***	-0.00	-0.01	-0.00	-0.01***	-0.03**	-0.00***
	(-5.46)	(-0.54)	(-0.91)	(-0.28)	(-2.90)	(-2.80)	(-2.95)

Values in the parentheses are t- statistics ** and * indicates significant level at five and ten percent respectively.

The foreign interest rate is significant and negative in Botswana indicating that low foreign interest rates in the advanced countries strengthen the development of stock market in Botswana. Domestic credit to the private sector is significant in both Kenya and Nigeria. The significance of foreign interest rates in Cote

d'Ivoire and Nigeria do not have the expected sign implying that high foreign interest rates will lead to better developed stock market. The sign of the domestic credit to the private sector is negative in Kenya but positive in Nigeria. The interpretation is that the level of financial development in Kenya is poor. It implies that people do not have access to credit to be able to participate in stock market business.

4.14 Deriving the Total Factor Productivity Model

The Total Factor Productivity (TFP) model is derived from the residual of estimation of the production function as is depicted in Table 4.19. The Cobb Douglas production is estimated using ordinary least square regression and the residual from such estimation constitute the TFP. Table 4.19 shows the output of production function regression from where the TFP is derived. This follows the approaches of Berument *et al*. (2011), Herzer (2012) and Miller and Upadhyay (2000). The approach is to first conduct the regression of the traditional factor input (Gross fixed capital, Labour turnover and human capital) determinants of growth on RGDP. The share of capital in income is taken to be 0.4 based on the average of national income figures of the countries. It is also in conformity with the empirical findings of Senhadji (2000) who finds that coefficient of capital stock is 0.43 for SSA region.

Table 4.19
Estimates Results of the Production Function Model

Dep. Var lRGDP

Variable	Coeff.	Std. Err.	t-statistics	p>|z|
lLFT	0.83	0.09	9.43	0.00***
lHCAP	0.58	0.07	7.94	0.00***
lGFK	0.09	0.05	1.69	0.09*
CONS.	8.44	1.17	7.22	0.00***

NOTE: ** and * indicates significant level at five and ten percent respectively.

The residuals from this estimation would then constitute the series for TFP. This is in line with the approaches of Berument *et al*. (2011), Herzer (2012) and Miller and Upadhyay (2000). The present study examines the influence of FDI and interest rate liberalization on productivity change which is TFP. Unlike the previous models where the three techniques of DFE, MG and PMG are employed, the only estimating technique for the TFP model is the MG technique of Pesaran and Smith (1995). The method of MG assumes heterogeneity of the slope, short run and long run parameters as well as the adjustment mechanism among the units in the group. In this estimation unlike the PMG the adjustment mechanism is not shown from the output.

4.15 Results of TFP Model with FDI

The estimates result of the TFP model is presented in Table 4.20. The model is estimated with the MG (1995) technique. This method unlike the other PMG (1997, 1999) does not show the adjustment mechanism among the individual countries. The technique estimates the long run relationship between TFP and

the influencing variables. The influencing variables for this model are; FDI, interest rate liberalization, foreign interest rate, domestic credit to the private sector and quality institutions. Finding reveals that interest rate liberalization and stock market liquidity are having positive long run relationship with TFP in the selected SSA economies. One percent increase in the index of interest rate liberalization leads to 0.01 percent improvement in the TFP in the long run for the selected seven SSA countries. The implication is that liberalization of interest rate has positive influence on the TFP in the seven selected SSA nations in the long run. This is in conformity with the findings of Miller and Upadhyay (2000) which find that openness has a positive significant on TFP for some developed countries. Foreign investment inflow has a positive significant effect on technical change in the long run for the selected SSA economies since the coefficient of FDI is statistically significant at ten percent.

On average increasing the index of interest rate liberalization by one percent would lead to 0.002 percent increase in foreign investment inflow in the long run for the selected seven SSA countries. The results is in accord with theory on FDI which postulates that foreign investment through the transfer of technological know-how and managerial expertise tend to enhance growth in the recipients' economies. It is also in conformity with Hung and Sun (2011) that find a positive effect of FDI on productivity in China. The study uses panel data that spans 1980 to 2005. Result suggests that FDI has an influence on TFP in China.

Table 4.20
Estimate Results of TFP Model with FDI and Interest Rate Liberalization

Dependent Variable lTFP				
Variable	Coefficient	Standard Error	t-statistics	p>|z|
lRLIB	0.009	0.003	3.18	0.004***
lFDI	0.002	0.001	1.78	0.000*
lDCPS	0.007	0.005	1.45	0.003
lUSTB	-0.002	0.008	-3.28	-0.004***
lINSTI	-0.005	0.004	-1.37	-0.012

NOTE: ** and * indicate significant at five and ten percent respectively.

Furthermore the result also corroborates the liberalization theory as well as foreign inflows theory. The M-S postulates that liberalization would enhance growth and increase foreign inflows for the developing countries. Also the literatures on the determinant of capital inflow stress that low foreign interest rate in the industrial countries are part of the drivers of foreign inflows to the developing countries. The theory has been validated by the result of the negative relationship between foreign interest rate and productivity change.

4.16 Conclusion

In conclusion, the two techniques employed in this study investigate long run relationship between the different dependent variables (stock market development, FDI inflows and the TFP) and the explanatory variables. The difference in technique of estimation stems from the assumptions of restriction and non-restriction of the long run coefficients. The study adopts both the MG and PMG where data availability permits. PMG technique is employed for estimating models one through three while the TFP model is estimated with the MG estimator. The appeal of PMG over the other methods is in its ability to estimate different individual adjustment periods for each country and this

conforms to theory. Also the rates of adjustment to long run equilibrium among these countries are also not the same. However, the long run (factors) like the levels of technology and economic development of these seven SSA nations is similar which justifies the adoption of PMG technique.

CHAPTER FIVE

SUMMARY, POLICY RECOMMENDATION AND CONCLUSION

5.1 Introduction

The study sets out to investigate the postulation that liberalizing the financial markets of the selected SSA economies would lead to development through increase in stock market development, FDI inflows and improvement in productivity. It uses dynamic heterogeneous panel dataset that spans 1990 to 2013. The technique of PMG is employed for analysing the existence of long run relationships between stock market development and interest rate liberalization; FDI and interest rate liberalization. The MG technique is employed for exploring relationship between FDI inflow and productivity change.

5.2 Summary of Findings

Findings corroborate the postulation of positive long run influence of interest rate liberalization on foreign investment inflow. However empirical result does not support the theoretical notion that liberalizing the interest rates would have positive influence on the stock market development in the long run for the selected SSA nations. Furthermore revelations from the TFP model show that both interest rate liberalization and FDI inflows have positive long run impacts on productivity as measured in technical efficiency. The theoretical interpretation of the finding is that liberalizing interest rate would increase the level of interest rate. Increased interest rate is extra cost to both domestic as well

as foreign investors that would have to borrow from the banks in order to invest in the stock markets. As a consequence of this, interest rate liberalization will increase rate of interest and thus discourage rather than encourage more investors in the local stock markets. Low investors' patronage of the stock markets lead to reduced liquidity of the market and this adversely affect the development of the stock market.

This is corroborated by Ho *et al*. (2013) that finds a negative relationship between interest rate and foreign investment in China and South Africa for the period 1977 to 2010. The result on institutional quality is significant with the expected sign conforming to theoretical expectation. Interest rate liberalization with the support of proper supervisory and regulatory framework will go a long way to instil financial discipline in the polity. In addition to this, entrenchment of property rights and protection of investor's interests will also encourage investors' confidence in the financial markets (Galbis, 1993). Improved quality institutions through reduction in political risk lead to better developed stock markets in emerging countries (Perotti & Oijen, 2001). The conclusion is that better quality institutions would in the long run lead to a more developed stock market for the selected SSA countries.

Result on the influence of liberalization of interest rates on foreign investment is justified by financial liberalization theory. M-S postulates that liberalizing the economies of the developing countries would lead to more inflow of scarce foreign capital. Alfaro *et al.* (2004) examine the effects of financial markets in

promoting FDI in developed and developing countries and conclude that a well-developed financial market promotes FDI in the host country. The theoretical implication of the result is that liberalizing the rate of interest leads to more foreigners establishing industries in the domestic economies. This increases FDI inflows and therefore validates the theoretical postulations on foreign investment inflows. Real GDP is another variable influencing FDI inflows in the selected SSA countries. The results of all the three techniques presented indicate positive long run effects of growth on FDI. This is in line with economic theory which states that part of the determinant of FDI inflow is high level of income.

Countries with high level of economic growth coupled with human capital development are able to attract more inflows of foreign investments. Alfaro *et al.* (2004) also discover that there is a causal relationship between FDI and economic growth in a study of some developed and industrial countries. The result of the fourth objective which is the long run influence of stock market liberalization on stock market development is positive and conforms to theoretical postulations. Liberalization theory purports that liberalizing the stock market leads to the enhancement of the stock market. The empirical support is in Henry (2000) who finds that liberalization of stock market in some emerging economies lead to investment boom. It is also confirmed by El-Wassal (2005) who finds positive effect of liberalization on development of stock market in 40 emerging economies.

The estimation method employed for the TFP model is the MG that assumes heterogeneity of both the short and long run coefficients. The result indicates that FDI inflows and liberalization of interest rate have positive effect on TFP in the long run for the seven selected SSA countries. This is in conformity with Safdar Ullah (2005). Another empirical support for the positive effect of FDI on TFP is Griffth *et al.* (2003) who study the effect of FDI on productivity growth in UK for the period 1980 to 1992. Foreign investment is one of the major determinants of TFP through technology transfer. The host economies with appropriate manpower can also adapt the needed skill through the foreign investors to further boost the human capital development necessary for growth. Foreign interest rate as measured in US Treasury bill has a negative effect on TFP. This result corroborates the proposition that low interest rate in the industrial economy is one of the factor encouraging capital inflows to the developing countries thereby promoting growth.

5.3 Policy Recommendations

Going by the results from the analysis of the study, the research makes some policy recommendations for the respective governments. The first area of attention is interest rate policy. The fact that the nascent economies of the SSA are underdeveloped and cannot be left to the whims and caprices of the market forces cannot be gainsaid. This point was corroborated by Stliglitz (2000) who advised that interest rate of the developing economies should not be left entirely to the market forces. While not undermining the import of deregulated interest rate, for the region of SSA, the interest rate liberalization should be a guided

one. This is because the large informal sectors that make up a greater percentage of the economy would not be edge out of the credit market when interest rate is fully deregulated.

The second area that needs policy maker's attention is the issue of liberalizing the stock market. The study's finding is in support of stock market deregulation but it needs to be properly streamlined so that the repetition of 2007 to 2009 would not re-occur. This is a situation where the domestic stock markets are dominated by foreigners. When the tides are down the foreigners would leave the economies dry. Policy design for developing the domestic stock market should be tailored towards encouraging more locals or citizens to invest in the stock markets. The government pension scheme can be elaborated to encourage the stakeholders in the fund/pension management sectors to design facilities that would involve pensioner's investments in the stock markets. Moreover quality institutions which include but not limited to political stability, entrenchments and protection of property rights, reduced corruption and supervisory and regulatory framework should be improved.

The fact is that the quality of institutions constitutes the bulk of the reason why FDI inflow or stock market cannot contribute immensely to growth in the SSA region. The problem of poor institutions was corroborated by Calvo & Reinhart (1999) who pointed out that stock market infrastructural deficits is the reason why SSA stock markets are lagging behind. Singh (1997) lends his support to this bringing out the fact that information asymmetry still persists in the

industrial world. It is these developed economies that the developing countries look up to as catalysts. Furthermore, there is the need for the selected SSA countries to evolve strategies to improve FDI inflows with the aim of increasing productivity. It has been confirmed from the analysis that foreign investment can promote TFP. Increase in productivity through FDI inflows would go a long way to reducing the level of poverty that permeates the region of SSA. And this can be done by removing the bottlenecks, such as quality institutions, that are inhibiting the inflows of foreign investment.

5.4 Limitation of Study

One of the greatest challenges face in this study is in the area of sourcing for data. In the estimation of PMG it would have been desirable if the period of investigation is long enough for up to 30 years. It would enable the proper estimation of individual countries. This is due to the fact that PMG uses both time-series and cross sectional data. Long period data for some variables in the SSA region are not easy to come by. Examples are the data on institutional quality, market capitalization and turnover ratio. The long period data for these variables are not available. This is why extrapolation method has to be adopted in collating data for turnover ratio and market capitalization from 1990 to 2000. Another limitation is that the effect of 2007/2008 world financial crises on the development of stock market; FDI and productivity is not investigated. Investigating the effects of the world crisis would have given a clearer picture as to the movement or variation of these variables. And this can be used for policy analysis on effect of future crisis.

5.5 Suggestion for Future Research

The effect of stock market liberalization on equity capital inflow for the region of SSA has not been investigated to the best of our knowledge. The research into this area is therefore recommended to see whether liberalizing the stock market actually leads to more inflow of equity capital into the SSA. Equity capital inflows are the foreign inflows that result from foreigners' investment in the stock markets. Another area of recommendation for future research is the decomposition of TFP into both technological change and technical efficiency. This decomposition would give direction as to the sources of low growth in productivity in the SSA region whether it is due to lack of ability to innovate or inefficiency in the means of production.

5.6 Conclusion

The conclusion that emanates from the present study is that based on the MG estimating technique, the existence of long run relationship between FDI and productivity is established. It is thus imperative for policy makers in the respective SSA nations to design policy that aim at enhancing foreign investment. In the same way through the technique of PMG the presence of long run relationship between institutional quality and development of stock market is established, it is important that governments should strategize policy that would upgrade and increased facilities for stock markets improvement. This include entrenchment of property rights; political stability, reduced corruption. The growth levels of the selected economies of the SSA can be improved

through policies that are aim at increasing productivity. Productivity can be improved through promotion of FDI inflows.

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